
Overview of Scripting and Preparation of Publications with JPSP: Proceedings and Program(me) Booklet

Todd Satogata

Jefferson Lab and Old Dominion University

JACoW Team Meeting 2015

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JPSP: What Is It?

- JACoW Proceedings Scripts Package
 - VPL (Volker Public License) set of proceedings scripts
- Version 0.6 (first in version history): 22 Apr 2003
- Now Version 23.0 (Mac platform): 28 Sep 2015

```
[wlan2-151:C00L15-Volker/t/SCS2015-150929] satogata% wc -l *.pl
 307 generate_toc-110525.pl
11606 spmsbatch-150928.pl
 411 spmsread-140325.pl
 242 spmsreadrearrange-100410.pl
12566 total
```

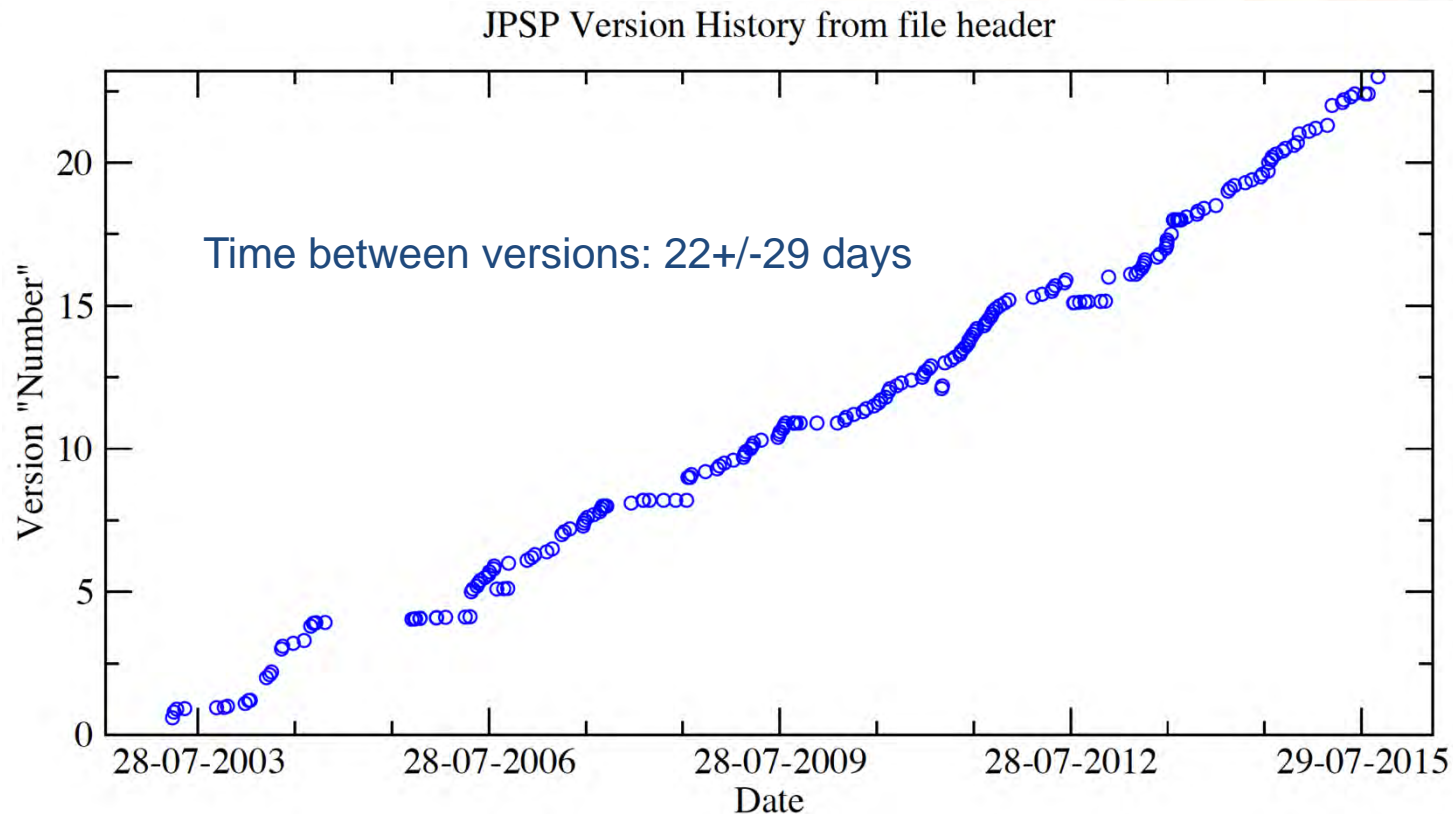
Date of this version
e.g. 2015-09-28

12,000+ lines of Perl code

```
v0.6 22. Apr 2003 volker rw schaa
v0.8 28. Apr 2003 volker rw schaa
v0.9 08. May 2003 volker rw schaa
v0.92 07. Jun 2003 volker rw schaa sort order con
v0.95 05. Oct 2003 volker rw schaa coloring of au
and institutes
v0.96 03. Nov 2003 volker rw schaa config file de
v1.0 15. Nov 2003 volker rw schaa some minor nu
v1.1 21. Jan 2004 volker rw schaa read additiona
v1.2 03. Feb 2004 volker rw schaa abstracts will
(in addition t
change of some
into flushleft
v2.0 10. Apr 2004 volker rw schaa adaption to m
v2.1 22. Apr 2004 volker rw schaa nearly full ad
start of docum
v2.2 29. Apr 2004 volker rw schaa second stage o
abstracts now
```

Extensive detailed version history in code headers

JPSP Development



- Development history of JPSP scripts
 - Lesson: If your version is >1 month old, it's out of date
 - This means my version from Sep 28 is probably out of date!
 - Volker alone is the source for new versions
 - Raphael and I nag him to put new versions on Sourceforge/wiki

Excellent (but Outdated) Documentation

JPSP

JACoW Proceedings Scripts Package
for SPMS and InDiCo conferences



Version for Windows OS

Volker RW Schaa
GSI, Darmstadt, Germany

Version 091011
Script version V 10.0
Documentation version V 10.0

- <http://www.jacow.org/index.php?n=Tools.Scripts>
- Note the date! (2010!)
- Scripts are embedded as a zip file within the PDF for the manual
- Newer versions (2013-11-18) of scripts are available on JACoW.org website above

Software Requirements

2	Software needed by the JACoW proceedings scripts	6
2.1	Perl	6
2.1.1	Additional Perl Module	7
2.1.2	Checking the Installation	8
2.2	L ^A T _E X	8
2.2.1	WinEdt	9
2.2.2	Checking the Installation	9
2.2.3	Autoloading of not Installed L ^A T _E X Packages	9
2.3	File Transfer Utility: wget	10
2.4	PDF utilities pdfinfo, pdftotext, pdffonts, ...	11
2.5	Autorun Inf Editor	12
2.6	Ruby Scripting Language	13

- We have recently made the scripts work on Macs (well, Todd's Mac), Windows, and Linux installations
- The truly critical packages from above are
 - perl, LaTeX, wget, pdf utilities
 - LaTeX should include ConTeXT for program guide
 - It helps greatly if you are a perl and TeX/LaTeX hacker

The Documentation Works Very Well

- The documentation is **extremely** good IF
 - You carefully follow it step by step
 - Your system software is installed properly
 - You set up the configuration file correctly
 - Includes ISBN info
 - Includes conference details
 - Includes SPMS details like passphrases

3 JACoW Scripts and Command Procedures

The general setup and the execution of the JACoW scripts are first listed in sequence and described in detail later.

- ➊ Setup of local site for JACoW scripts
 - ➊ Setup scripts and base directories with SCS2009.ZIPPED (↔ section 3.1)
 - ➋ Adapt the configuration file »conference.config« to your needs (↔ section 3.2)
- ➋ Pre-conference run (↔ section 4.1)
 - ➊ Download the conference XML file from SPMS or InDiCo (↔ section 3.3)
 - ➋ For the production of an Abstract booklet run the »spmsbatch.pl« script to generate the source input for the Abstract booklet (↔ section 3.4)
 - ➌ Start ConTeXt (it's a variant of T_EX like L^AT_EX) to compile the generated files and produce an Abstract booklet (↔ section 4.2)
- ➌ Production run (↔ section 4.1)
 - ➊ Download the conference XML file from SPMS or InDiCo, make sure for SPMS conferences that after »Final QA« paper TOC values have been generated (↔ section 3.8.1), for InDiCo conferences see item ➋ (↔ section 3.3)
 - ➋ Use the batch file »pdfwget.bat« to download the PDF files of the edited papers, the transparencies and posters from SPMS or InDiCo. The files will be placed automatically in the correct directory (papers into »raw_paper_directory«, transparencies into »slides_directory« and posters in »posters_directory«) (↔ section 3.5)
 - ➌ For InDiCo conferences generate now page count and TOC values using the script »generate_toc.pl« (↔ section 3.8.2)
 - ➍ Run the script »pagecheck.pl« to compare the number of pages a pdf file has in the SPMS database against the real pdf file, find deviations in page count, paper size, PDF version, font inclusion from the JACoW standard (↔ section 5.2)
 - ➎ Run the script »scan-keywords.pl« to generate the list of used keywords (↔ section 3.7)
 - ➏ Run the script »spmsbatch.pl« to generate web pages, the T_EX files for the proceedings volume and to package the papers from »./PAPERS-FINAL« (↔ section 3.4)
 - ➐ Run the command file »gen_texpdf.bat« in »./papers« to package the raw files (adding page numbers, header and footer lines, fill hidden fields with keywords, etc.) (↔ section 3.6)
 - ➑ Rerun the script »spmsbatch.pl« again to make sure that all links are generated.
 - ➒ Copy all files »./papers/*.pdf«, »./html/*.«*, »./talks/*.pdf«, »./audio/*.mp3« and »./posters/*.pdf«, and the final »index.htm« to the webserver directories
- ➍ Check of consistency (↔ section 5)
 - ➊ Check the generated pdf files for completeness (↔ section 5.1)
 - ➋ Use Xenu to check the script generated web pages for broken links and orphan files (↔ section 5.3)
- ➎ Compare all errors that have occurred and could not be explained to the ones documented in section »Known Bugs« (↔ section 8).

JPSP Example: IBIC15 Configuration

```
# post-conference setup
#-----
#          _pub_date  year and month (numerical) of publication on JACoW, i.e. "2012-10"
#
conference_SPMS      = https://spms.kek.jp/pls/ibic2015/
conference_xmlfile    = spms.xml
#*****
# OS platform
#
#-----
#   os_platform
#       Windows    will use syntax for MS Windows copy/delete
#       Linux      uses cp/rm
#       MACOS      uses cp/rm
#
os_platform          = MACOS                # Windows or Linux/MAC OS
#*****
# Conference parameters
#
conference_logo       = logo-sm.png
conference_logo_size  = 477x129              # real logo size can be scaled by these numbers
conference_url        = http://jacow.org/IBIC2015/  # where it will appear at JACoW (used for Inspire dataset)
conference_respm      = v.r.w.schaa@gsi.de
conference_name       = IBIC2015
conference_site       = Melbourne, Australia
conference_title      = 4th International Beam Instrumentation Conference
conference_date       = 13-17 September 2015
conference_longname    = 4th International Beam Instrumentation Conference, Melbourne, Australia, 13-17 September 2015
conference_series     = International Beam Instrumentation Conference
conference_number     = 4
conference_editor     = "Schaa, Volker RW (GSI, Darmstadt, Germany)"
conference_isbn       = 978-3-95450-176-2        # ask Volker!!
conference_pub_date   = 2015-12                # 2012-10
conference_pub_by     = JACoW
conference_pub_copyr  = Copyright \copyright{} 2015 CC-BY-3.0 and by the respective authors
#*****
```



JPSP Example: IBIC'15 XML Download

```
[wlan2-151:C00L15-Volker/t/SCS2015-150929] satogata% perl spmsread-140325.pl
I found 0 command-line argument(s).

This is version 3.5 of 25 March 2014
config file 'conference.config' found!

>>
>> reading from URL: https://spms.kek.jp/pls/ibic2015
>>

xml file from config is: 'spms.xml'
File ->./XML/spms.xml<- is new!
--2015-11-17 17:56:27-- https://spms.kek.jp/pls/ibic2015/spms_summary.xml
Resolving spms.kek.jp (spms.kek.jp)... 130.87.104.79
Connecting to spms.kek.jp (spms.kek.jp)|130.87.104.79|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/xml]
Saving to: './XML/spms_summary.xml'

./XML/spms_summary.xml          [ <=> ] 1.76K --.-KB/s in 0s

2015-11-17 17:56:30 (28.6 MB/s) - './XML/spms_summary.xml' saved [1798]

basic spms file './XML/spms_summary.xml' found!
loading xml file for session MOMA
--2015-11-17 17:56:30-- https://spms.kek.jp/pls/ibic2015/xml2.session?sid=MOMA
Resolving spms.kek.jp (spms.kek.jp)... 130.87.104.79
Connecting to spms.kek.jp (spms.kek.jp)|130.87.104.79|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/xml]
Saving to: './XML/MOMA.xml'

./XML/MOMA.xml                  [ <=> ] 1.10K --.-KB/s in 0s
```

Reading session XML files

~1 minute, downloads 21 XML files from SPMS to XML directory using wget

JPSP Example: IBIC'15 spmsbatch

```
[wlan2-151:COOL15-Volker/t/SCS2015-150929] satogata% perl spmsbatch-150928.pl
you are using ---> v 22.0 - 23.0-28 sep 2015 vrws
config file 'conference.config' found!
    OS platform      = darwin
    OS platform id   = 0
conference_pub_by JACoW
config file points to './XML/spms.xml'
logo: 477 x 129
no Code&Location file found on line 187
going to close session [' 0':MOMA ] [chairs :1] : Opening
going to close session [' 1':MOALA ] [chairs :1] : Introduction
going to close session [' 2':MOBLA ] [chairs :1] : Overview and Commissioning
going to close session [' 3':MOCLA ] [chairs :1] : Time Resolved Diagnostics and Synchronization
--> Papercode: mopb023 ### Documentname: paper_mopb023.doc
--> Papercode: mopb023 ### Documentname: paper_mopb023.doc
--> Papercode: mopb049 ### Documentname: mopb049_paper.tex
going to close session [' 4':MOPB ] [chairs :0] : Poster Session 1
going to close session [' 5':TUALA ] [chairs :1] : Tutorial 1
going to close session [' 6':TUBLA ] [chairs :1] : BPMs and Beam Stability
going to close session [' 7':TUCLA ] [chairs :1] : Transverse Profile Monitors
--> Papercode: tupb052 ### Documentname: tupb052_proceedings.doc
--> Papercode: tupb052 ### Documentname: tupb052_proceedings_v1.doc
--> Papercode: tupb059 ### Documentname: paper_tupb059.tex
--> Papercode: tupb072 ### Documentname: wedla02.tex
going to close session [' 8':TUPB ] [chairs :0] : Poster Session 2
going to close session [' 9':TUMA ] [chairs :1] : Public Lecture - Shared Views of the Southern Sky
going to close session ['10':WEALA ] [chairs :1] : Tutorial 2
going to close session ['11':WEBLA ] [chairs :1] : Beam Loss Detection
going to close session ['12':WECLA ] [chairs :1] : Beam Charge Monitors and Other Instruments
going to close session ['13':WEDLA ] [chairs :1] : Contributed Orals
going to close session ['14':WETMCG] [chairs :0] : MCG Tour (Optional)
going to close session ['15':WEDMCG] [chairs :0] : Conference Dinner at MCG
going to close session ['16':THALA ] [chairs :1] : Tutorial 3
going to close session ['17':THBLA ] [chairs :1] : Closing Session
going to close session ['18':THTAS ] [chairs :0] : Tour of Australian Synchrotron
Conference XML 'IBIC2015' closed
```

Session details in order

Writes other scripts that are used later

JPSP Example: IBIC'15 pdfwget script

```
[wlan2-151:C00L15-Volker/t/SCS2015-150929] satogata% ./pdfwget.bat
--2015-11-17 18:08:03-- https://jacowfs.jlab.org/cgi-bin/ibic15/editor.zipdownload?paper_id=MOALA01&wanted_file=MOALA01_TALK.PDF&hcheck=601165ec9157d9b96cb5a67b867cd5ce
Resolving jacowfs.jlab.org (jacowfs.jlab.org)... 129.57.64.51
Connecting to jacowfs.jlab.org (jacowfs.jlab.org)|129.57.64.51|:443... connected.
WARNING: The certificate of 'jacowfs.jlab.org' is not trusted.
WARNING: The certificate of 'jacowfs.jlab.org' hasn't got a known issuer.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/octet-stream]
Saving to: 'moala01_talk.pdf'

moala01_talk.pdf          [          ] 35.59M 217KB/s in 2m 36s

2015-11-17 18:10:41 (233 KB/s) - 'moala01_talk.pdf' saved [37316497]

--2015-11-17 18:10:41-- https://jacowfs.jlab.org/cgi-bin/ibic15/editor.zipdownload?paper_id=MOALA02&wanted_file=MOALA02_TALK.PDF&hcheck=bb987a2f242c7006b0578c14e2a24420
Resolving jacowfs.jlab.org (jacowfs.jlab.org)... 129.57.64.51
Connecting to jacowfs.jlab.org (jacowfs.jlab.org)|129.57.64.51|:443... connected.
WARNING: The certificate of 'jacowfs.jlab.org' is not trusted.
WARNING: The certificate of 'jacowfs.jlab.org' hasn't got a known issuer.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/octet-stream]
Saving to: 'moala02_talk.pdf'

moala02_talk.pdf          [          ] 7.03M 240KB/s
```

215 KB/s from my hotel room. Ouch!

2.5 minutes to download 35.6 Mb talk

- Make sure you have adequate bandwidth to server
- You will be downloading ALL the papers and talks to process them into the proceedings
- 1 hour later...

JPSP Example: IBIC'15 pagecheck script

```
[wlan2-151:t/SCS2015-150929/PAPERS-FINAL] satogata% perl pagecheck-150929.pl
Num arg (0)
reading pdfs from directory: ./
reading #pages from: './pages_per_paper.txt'
line #Serv=https://spms.kek.jp/pls/ibic2015/;Up=Uws8DCwFwv0ZJnJgSuevSNU;
Serv: https://spms.kek.jp/pls/ibic2015/
Pass: Uws8DCwFwv0ZJnJgSuevSNU
[ 1] 1115= MOALA01 => 0 (Edi: QA: Status: )
[ 2] 1112= MOALA02 => 0 (Edi: QA: Status: )
[ 3] 1102= MOBLA01 => 7 (Edi: Evelyn Akers QA: Kathleen Riches Status: Green)
[ 4] 1301= MOBLA02 => 4 (Edi: Andreas Moll QA: Evelyn Akers Status: Green)
[ 5] 1420= MOBLA03 => 8 (Edi: David Taylor Button QA: David Taylor Button Status: Green)
[ 6] 1104= MOCLA01 => 5 (Edi: Volker RW Schaa QA: David Lopez Nonell Status: Green)
[ 7] 1361= MOCLA02 => 5 (Edi: Evelyn Akers QA: Kathleen Riches Status: Green)
[ 8] 1377= MOCLA03 => 0 (Edi: QA: Status: )
[ 9] 1533= MOPB001 => 3 (Edi: Andreas Moll QA: Kathleen Riches Status: Green)
[10] 1447= MOPB002 => 8 (Edi: Simon Cunningham QA: David Taylor Button Status: Green)
[11] 1548= MOPB004 => 0 (Edi: QA: Status: )
[12] 1457= MOPB005 => 0 (Edi: QA: Status: )
[13] 1458= MOPB006 => 8 (Edi: David Taylor Button QA: Kathleen Riches Status: Green)
[14] 1480= MOPB007 => 5 (Edi: Evelyn Akers QA: Kathleen Riches Status: Green)
[15] 1471= MOPB009 => 3 (Edi: Evelyn Akers QA: Magdalena Montes-Loera Status: Green)
[16] 1390= MOPB011 => 8 (Edi: David Taylor Button QA: Kathleen Riches Status: Green)
[17] 1365= MOPB012 => 4 (Edi: Volker RW Schaa QA: Evelyn Akers Status: Green)
[18] 1478= MOPB013 => 5 (Edi: Simon Cunningham QA: Evelyn Akers Status: Green)
[19] 1488= MOPB014 => 4 (Edi: David Taylor Button QA: Kathleen Riches Status: Green)
[20] 1522= MOPB015 => 4 (Edi: David Taylor Button QA: Evelyn Akers Status: Green)
[21] 1537= MOPB016 => 4 (Edi: David Taylor Button QA: David Lopez Nonell Status: Green)
[22] 1456= MOPB017 => 5 (Edi: Volker RW Schaa QA: Evelyn Akers Status: Green)
[23] 1441= MOPB018 => 5 (Edi: David Taylor Button QA: Kathleen Riches Status: Green)
[24] 1535= MOPB019 => 0 (Edi: QA: Status: )
[25] 1347= MOPB021 => 5 (Edi: David Lopez Nonell QA: Kathleen Riches Status: Green)
```

```
[wlan2-151:t/SCS2015-150929/PAPERS-FINAL] satogata% more pagecheck-result_20151117-2330.txt
MOBLA03 Editor: David Taylor Button
Status Green
QA by David Taylor Button
# spms: 8, file: 5 pages
MOPB002 Editor: Simon Cunningham
Status Green
QA by David Taylor Button
# spms: 8, file: 3 pages
# possible problems with non JACoW page size: '595 x 842'
MOPB006 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 5 pages
MOPB011 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 3 pages
MOPB045 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 4 pages
TUPB016 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 3 pages
TUPB028 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 3 pages
TUPB082 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 3 pages
WEBLA02 Editor: Kathleen Riches
Status Green
QA by David Taylor Button
# spms: 8, file: 5 pages
WEBLA03 Editor: Volker RW Schaa
Status Green
QA by Simon Cunningham
page count ok ( 5 pages)
# #fonts 90
WECLA02 Editor: David Taylor Button
Status Green
QA by David Taylor Button
# spms: 8, file: 5 pages
THALA01 Editor: David Taylor Button
Status Green
QA by Kathleen Riches
# spms: 8, file: 7 pages
```

Page size problem

pages "problems"

fonts problem

- The script that finds problems
 - Run daily in editorial room
- Also generates a script that fixes page number metadata in SPMS instance

JPSP Example: IBIC'15 boxcheck script

```
[wlan2-151:t/SCS2015-150929/PAPERS-FINAL] satogata% perl boxcheck-20150520.pl |& grep -v uninitialized
MOBLA01.PDF |1: 1 |2: 32 |3: 1 |4: 49 |5: 91 |6: 17 |7: 1 |total: 192
MOBLA02.PDF |1: 1 |2: 9 |3: 1 |4: 4 |total: 15
MOBLA03.PDF |1: 1 |2: 42 |3: 2 |4: 1 |5: 1 |total: 47
MOCLA01.PDF |1: 1 |2: 1 |3: 3 |4: 2 |5: 1 |total: 8
MOCLA02.PDF |1: 8 |2: 41 |3: 161 |4: 182 |5: 212 |total: 604
MOPB001.PDF |1: 93 |2: 71 |3: 51 |total: 215
MOPB002.PDF |1: 237 |2: 30 |3: 57 |total: 324
MOPB006.PDF |1: 24 |2: 18 |3: 13 |4: 45 |5: 43 |total: 143
MOPB007.PDF |1: 119 |2: 119 |3: 7 |4: 1 |5: 1 |total: 247
MOPB009.PDF |1: 121 |2: 1 |3: 1 |total: 123
MOPB011.PDF |1: 120 |2: 1 |3: 160 |total: 281
MOPB012.PDF |1: 225 |2: 29 |3: 6 |4: 1 |total: 261
MOPB013.PDF |1: 1 |2: 2 |3: 127 |4: 106 |5: 1 |total: 237
MOPB014.PDF |1: 11 |2: 3 |3: 2 |4: 1 |total: 17
MOPB015.PDF |1: 1 |2: 1 |3: 4 |4: 6 |total: 12
MOPB016.PDF |1: 25 |2: 4 |3: 2 |4: 1 |total: 32
MOPB017.PDF |1: 2 |2: 6 |3: 5 |4: 4 |5: 2 |total: 19
MOPB018.PDF |1: 120 |2: 172 |3: 83 |4: 101 |5: 52 |total: 528
MOPB021.PDF |1: 99 |2: 1 |3: 1 |4: 1 |5: 3 |total: 105
MOPB022.PDF |1: 138 |2: 2 |3: 28 |4: 65 |total: 233
MOPB023.PDF |1: 2 |2: 15 |3: 1 |total: 18
MOPB025.PDF |1: 91 |2: 115 |3: 1 |total: 207
MOPB026.PDF |1: 1 |2: 1 |3: 3 |total: 5
MOPB030.PDF |1: 6 |2: 4 |3: 1 |total: 11
MOPB031.PDF |1: 2 |2: 11 |3: 5 |total: 18
MOPB032.PDF |1: 108 |2: 196 |3: 77 |4: 1 |total: 382
MOPB034.PDF |1: 161 |2: 51 |3: 2 |4: 42 |5: 98 |total: 354
MOPB035.PDF |1: 137 |2: 9 |3: 16 |4: 11 |5: 5 |total: 178
MOPB036.PDF |1: 6 |2: 59 |3: 3 |total: 68
MOPB037.PDF |1: 6 |2: 6 |3: 4 |4: 5 |5: 63 |total: 84
MOPB038.PDF |1: 3 |2: 68 |3: 106 |4: 56 |5: 68 |total: 301
MOPB040.PDF |1: 108 |2: 10 |3: 54 |total: 172
MOPB041.PDF |1: 87 |2: 15 |3: 9 |4: 8 |5: 1 |total: 120
MOPB042.PDF |1: 114 |2: 123 |3: 84 |4: 20 |total: 341
MOPB043.PDF |1: 3 |2: 4 |3: 6 |4: 3 |5: 1 |total: 17
MOPB045.PDF |1: 1 |2: 112 |3: 57 |4: 139 |total: 309
MOPB046.PDF |1: 201 |2: 114 |3: 109 |4: 22 |total: 446
MOPB048.PDF |1: 86 |2: 84 |3: 104 |4: 422 |5: 5 |total: 701
MOPB049.PDF |1: 2 |2: 2 |3: 101 |4: 78 |total: 183
MOPB050.PDF |1: 1 |2: 24 |3: 24 |4: 12 |5: 1 |total: 62
MOPB051.PDF |1: 123 |2: 1 |3: 1 |4: 91 |5: 54 |total: 270
MOPB053.PDF |1: 98 |2: 6 |3: 6 |4: 4 |total: 114
MOPB055.PDF |1: 164 |2: 126 |3: 115 |4: 126 |5: 123 |total: 654
MOPB056.PDF |1: 2 |2: 2 |3: 1 |total: 5
MOPB057.PDF |1: 127 |2: 122 |3: 112 |total: 361
MOPB058.PDF |1: 6 |2: 188 |3: 4 |total: 198
MOPB063.PDF |1: 96 |2: 3 |3: 5 |4: 65 |total: 169
MOPB064.PDF |1: 19 |2: 35 |3: 52 |4: 66 |5: 1 |total: 173
MOPB065.PDF |1: 2 |2: 1 |3: 64 |4: 49 |total: 116
MOPB066.PDF |1: 3 |2: 5 |3: 3 |4: 5 |5: 2 |total: 18
MOPB067.PDF |1: 6 |2: 1 |3: 1 |4: 1 |5: 1 |total: 10
MOPB068.PDF |1: 132 |2: 108 |3: 113 |4: 127 |5: 1 |total: 481
```

- A new script (earlier this year) that finds “tearing pages”
 - PDF bounding box problems
 - These papers need to be reprocessed
- Look for lines with ‘##’
- In IBIC15, this indicated that paper WEBLA02 had a problem
 - Can be fooled by pages with lots of math, large very detailed PS figures

JPSP Examples: WEBLA02 Tearing Boxes

DEVELOPMENT OF THE BEAM LOSS MONITOR FOR BEAM HALO MEASUREMENT IN THE J-PARC RCS

M. Yoshimoto#, H. Harada, K. Okabe, M. Kinsho,
J-PARC, JAEA, Tokai, Ibaraki, 319-1195, Japan

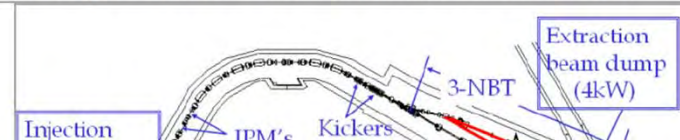
Abstract

In the J-PARC RCS, transverse beam profiles including both the beam core and halo at extraction beam transport line (3NBT) were measured by using a combination with a wire scanner type beam scraper and some beam loss monitors (BLMs). Our final goal of this halo monitor is to measure the intra-bunch beam halo of extracted two bunches from the RCS. Thus the plastic scintillator and photomultiplier (PMT) assemblages were adopted as the BLMs with quick time response. However, we found that the BLMs detected not only the radiation from the wire but also reflected one from other devices and wall. Therefore we tried to develop new-type BLMs, which are scintillation-type BLM of lead glass and Cherenkov-type BLM of quartz or UV acrylic. In this presentation, we will report on the overview and experimental results of the new-type BLMs together with the outline of halo monitor system.

INTRODUCTION

RCS. Thus a new beam halo monitor was developed and installed at the 3GeV-RCS to Neutron source Beam Transport (3NBT) line as shown in Fig. 1 and Fig. 2 [4]. This new beam halo monitor was constructed by combining a wire scanner type beam scraper and some beam loss monitors (BLMs). The transverse beam profile including the beam core and beam halo can be reconstructed with the halo monitor. On the other hand, our final goal of the halo monitor is to measure not only the transverse beam halo but also the intra-bunch beam halo of the extracted two bunches from the RCS. However the beam experiments made clear that there are some issues for the intra-bunch beam halo measurement.

In this paper, we report the transverse beam halo measurement with the new beam halo monitor. In addition, we introduce the new BLMs which were developed for intra-bunch beam halo measurement.



- Normal Acrobat/PitStop “edit text and images, select all” result: page 1

JPSP Examples: WEBLA02 Tearing Boxes

TRANSVERSE BEAM HALO MEASUREMENT

Measurement Principle

The new beam halo monitor was constructed by combining a wire scanner type beam scraper and some BLMs as shown in Fig. 3. Popular wire beam profile monitor detects the secondary electron emitted from the wire due to irradiate the beam. In this case, the wire signal should be disturbed by the floating electrons in the vacuum chamber. Moreover it is difficult to achieve a wide dynamic range for the beam halo measurement by using only the electric circuits. In contrast, our monitor detects the radiation in order to suppress the signal disturbance due to floating electrons. And more the ultra-wide dynamic range can be achieved by using the several BLMs with the different sensitivities.



type S-BLMs are a low sensitivity detectors to measure beam core elements.

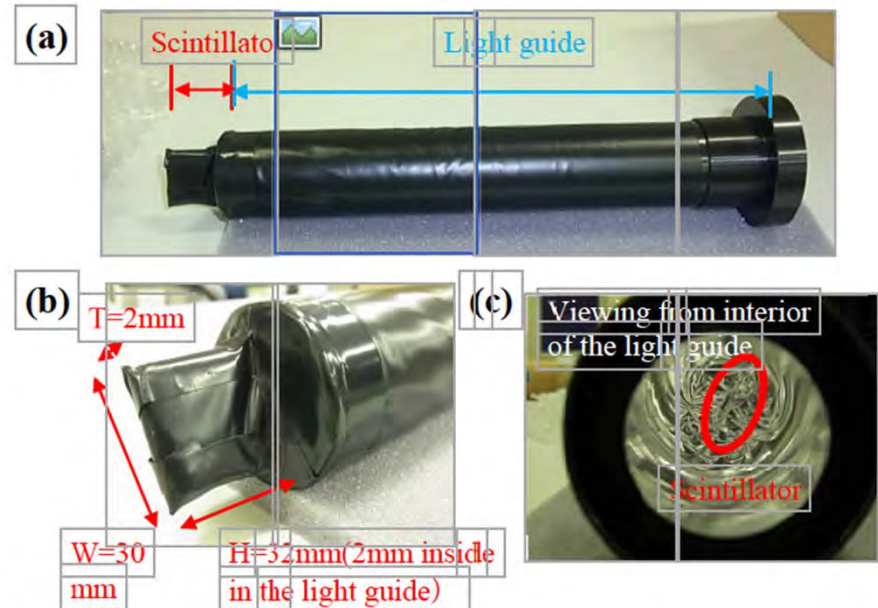


Figure 4: Photographs of the Small Scintillator type BLM. It has a light guide for a support of the thin plastic scintillator.

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[Home](#) | [Session Index](#) |
[Classification Index](#) |
[Authors Index](#) |
[Keyword Index](#) |
[List of Institutes](#)

A

[accelerating-gradient](#)
[acceleration](#)
[accumulation](#)
[alignment](#)
[antiproton](#)

B

[background](#)
[beam-beam-effects](#)
[beam-cooling](#)
[beam-diagnostic](#)
[beam-loading](#)
[beam-losses](#)
[beam-transport](#)
[betatron](#)
[booster](#)
[brightness](#)
[brilliance](#)
[bunching](#)

C

[cathode](#)
[cavity](#)
[civil-engineering](#)
[closed-orbit](#)
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Keyword: **accelerating-gradient**

Paper	Title	Other Keywords	Page
MOPIE081	Longitudinal Stability in Multi-Harmonic Accelerating Cavities	cavity, acceleration, cathode, collider	506

- [R.M. Jones](#), [L.R. Carver](#)
UMAN, Manchester, United Kingdom
- [J.L. Hirshfield](#)
Yale University, Physics Department, New Haven, CT, USA
- [Y. Jiang](#)
Yale University, Beam Physics Laboratory, New Haven, Connecticut, USA

Accelerating cavities that excite multiple modes at integer harmonics of the fundamental frequency can potentially be used to limit the effects of rf breakdown and pulsed surface heating at high accelerating gradients. Understanding the longitudinal stability and the acceptance of such a cavity is important to their development and use. The general Hamiltonian for longitudinal stability in multi harmonic cavities is derived and the particle dynamics are explored.

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Proceedings of IBIC2015, Melbourne, Australia

MOPB001

DEVELOPMENT OF A BEAM PULSE MONITOR FOR THE HEAVY ION ACCELERATOR FACILITY

D. Tsifakis[#], N.R. Lobanov, P. Linardakis, ANU, Canberra, Australia

Abstract

The Australian National University (ANU) Heavy Ion Accelerator Facility (HIAF) comprises of a 15 million volt electrostatic accelerator (NEC 14UD) followed by a superconducting LINAC booster. The pulsing system consists of a low energy, single gap, gridded buncher and two high energy choppers. The buncher and choppers need to be set in phase and amplitude for maximum efficiency. The LINAC encompasses twelve, lead tin-plated Split Loop Resonators (SLR). Each SLR, as well as the superbuncher and time energy lens, needs to be individually tuned in phase and amplitude for correct operation. The HIAF pulsing system is based on a few techniques. The first one utilises a U-bend at the end of the LINAC. One special wide Beam Profile Monitor (BPM) is installed after the 90 degrees magnet. The technique allows to set up correct phase by observing the displacement of beam profile versus phase shift of the last phase locked resonator. The determination of beam pulse characteristics are based on γ -ray detection produced by beam striking a tantalum target. In this paper, the HIAF set up for pulsed beam diagnostics with sub nanosecond time resolution is described. The system has demonstrated simplicity of operation and high reliability.

INTRODUCTION

The ANU Heavy Ion Accelerator Facility consists of a National Electrostatics Corporation 14UD electrostatic tandem accelerator and a superconducting LINAC booster accelerator. The LINAC comprises of four cryostats, each consisting of three, split-ring resonators, operating at a frequency of approximately 150 MHz. When the beam needs to be accelerated in the LINAC or when the beam is required by the accelerator users to be bunched, the facility's buncher systems are utilised. The first buncher is installed at the low energy section of the 14UD accelerator. It is a gridded, room temperature, buncher using one or three frequencies to produce the field required for bunching. The resulting bunch has a typical width of 1.5 ns FWHM and the bunching efficiency is approximately 0.25.

A second buncher, Super Buncher (SB), is installed at the LINAC entrance. SB is a superconducting, quarter-wave resonator with $\beta=0.1$, developed at the ANU and can further compress the beam to bunches with, typically, 100 ps FWHM.

All bunchers as well as the LINAC, are synchronised to the facility's master 150 MHz clock. The low energy

buncher operates on the sub-harmonic frequency of approximately 9.375 MHz (1/16 of the master clock) and the two high energy choppers on 37.5 MHz and 4.6875 MHz (1/4 and 1/32 of the master clock).

When the buncher systems are in use, it is important to have a monitoring system which allows the accelerator operator to measure the characteristics of the bunch in the time domain, to assist with the tuning. This paper describes the system used by the facility to produce a time profile of the pulsed beam. This technique of measuring the longitudinal profile is used together with other facilities such as [1]. The output of the pulse monitor is used together with other measurement and tuning techniques [2, 3] to optimise the LINAC beam.

The development of this system has happened through the years and with the scientific contribution of the researchers of the Department of Nuclear Physics.

METHOD DESCRIPTION

The beam pulse monitoring system, shown in Fig. 1 is based on the time difference between prompt γ -rays produced by the beam striking a tantalum target and the reference RF used to synchronise the rest of the accelerator.



Figure 1: The target station of the beam pulse profile monitor. The target, as seen through the viewing port, can be moved in/out and is rotated by 45 degrees with respect to the beam.

The target is mounted at a 45 degree angle to the beam and it is placed in the path of the beam. This results in prompt γ -rays being produced, which are detected by a barium fluoride (BaF₂) scintillation detector. The detector used at the ANU is made by Scionix Holland BV and is model number 38/25B30/2M BaFX2Neg. The BaF₂ detector signal provides the start signal to a time-to-analog converter (TAC) made by Ortec, model 567. The TAC is set to a maximum range of 100 ns. The amplitude signal from the detector is variable as the energy


[#]Dimitrios.Tsifakis@anu.edu.au

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Time Resolved Diagnostics and Synchronization

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[Programme Committee](#)

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[Table of Sessions](#)

[Authors Index](#)

[Keywords](#)

[List of Institutes](#)

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[Home](#) | [Session Index](#) | [Classification Index](#) | [Authors Index](#) | [Keyword Index](#) | [List of Institutes](#)

Table of Sessions

MOMA	Opening
MOALA	Introduct
MOBLA	Overview Commiss
MOCLA	Time Res Diagnosti Synchron
MOPB	Poster Se
TUALA	Tutorial 1
TUBLA	BPMs and Beam Sta
TUCLA	Transvers Profile Monitors
TUPB	Poster Se
TUMA	Public Lec Shared Vi the South Sky
WEALA	Tutorial 2
WEBLA	Beam Los Detector
WECLA	Beam Ch Monitors Other Instrume
WEDLA	Contribut Orals
WETMCG	MCG Tou (Optiona

MOPB — Poster Session 1 (14-Sep-15 16:00—18:00)

Paper	Title	Page
MOPB001	Development of a Beam Pulse Monitor for the Heavy Ion Accelerator Facility	1
<ul style="list-style-type: none">D. Tsifakis, P. Linardakis, N.R. Lobanov Research School of Physics and Engineering, Australian National University, Canberra, Australian Capitol Territory, Australia		
<p>The ANU Heavy Ion Accelerator Facility (HIAF) comprises a 15 MV electrostatic accelerator (NEC 14UD) followed by a superconducting LINAC booster. The pulsing system consists of a low energy single gap gridded buncher and two high energy choppers. Buncher and choppers need to be set in phase and amplitude for maximum efficiency. The LINAC encompasses twelve lead tinned Split Loop Resonators (SLR). Each SLR, as well as the superbuncher and time energy lens, needs to be individually tuned in phase and amplitude for correct operation. The HIAF pulsing system is based on a few techniques. The first one utilises a U-bend at the end of the LINAC. One special wide Beam Profile Monitor (BPM) is installed after the 90 degrees magnet. The technique allows to set up correct phase by observing the displacement of beam profile versus phase shift of the last phase locked resonator. The determination of beam pulse characteristics are based on X-ray detection produced by beam striking a Ta target. In this paper the HIAF set up for pulsed beam diagnostics with sub nanosecond time resolution is described. The system has demonstrated simplicity of operation and high reliability.</p>		
 Poster MOPB001 [3.526 MB]		
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MOPB002	A Compact Weather Station for Monitoring Environmental Effects on Beam Properties and Equipment	1
<ul style="list-style-type: none">S. Cunningham, R. Clarken, A. C. Starritt ASCo, Clayton, Victoria, AustraliaA. C. Starritt SLSA, Clayton, Australia		
<p>A compact and mobile weather station has been designed and integrated with EPICS to assist with environmental monitoring at the Australian Synchrotron. This proved invaluable in correlating the dependence of the Storage Ring RF</p>		

And now slides from Volker's WECA2 Valencia Team Meeting presentation on program booklets...



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    {09:10}{09:45}{35}$
    {LHC - Challenges in Handling Beams Exceeding 100 MJ}$
    {\bold{R.~Schmidt} (CERN) }$
    {The Large Hadron Collider (LHC) at CERN operates at 4 TeV with high i
    The energy stored in each beams is beyond 130 MJ, less than a factor o
    a regime where various effects due to high intensity bunches are obser
    collimation system limits beam losses that threaten to quench supercon
    during the different operational phases, where already a small fractio
    case of uncontrolled beam loss. Safe operation in presence of such hig
    dumping system, beam interlocks, beam instrumentation, equipment monit
    machine protection and collimation will be discussed.}
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- * sessions
- * papers
- * author index
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- * table of contents formatting
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FRYAP — Invited Oral Presentation (Synchrotron Light Sources and FELs)	353
FRYAP01 The Future of X-ray FELs	353
FRYBP — Invited Oral Presentation (Hadron Accelerators)	353
FRYBP01 Accelerators for Intensity Frontier Research	353
FRYCP — Closing Invited Oral Presentation	353
FRYCP01 Physics Results at the LHC and Implications for Future HEP Programmes	353
Author List	354

IPAC 2012 — New Orleans, LA, USA, May 21–25, 2012

6

21-May-12 09:30 – 10:00	Invited Oral	Hall B (Plenary)
MOXAP — Invited Oral Presentation (Synchrotron Light Sources and FELs)		
Chair: V.P. Suller (LSU/CAMD)		
MOXAP01 09:30	The Scientific Revolution Enabled by X-ray Free Electron Lasers — J. Stohr (SLAC)	
This talk outlines how the advent of x-ray free electron lasers (X-FELs) has fundamentally changed x-ray science and is envisioned to enable the solution of important scientific problems that impact human life. While we are still exploring how to understand the interactions of the ultra-strong and ultra-short FEL x-ray pulses with matter and developing methods of improved control of the pulse properties, we are already using FEL x-rays for the solution of important problems in such areas as life science and health, the generation and storage of energy and the understanding of technological processes and their limits imposed by the laws of nature. This talk will review the present state of the dynamic and exciting development of X-FEL science and provide a glimpse of the future.		
21-May-12 10:00 – 10:30	Invited Oral	Hall B (Plenary)
MOXBP — Invited Oral Presentation (Circular and Linear Colliders)		
Chair: V.P. Suller (LSU/CAMD)		
MOXBP01 10:00	The First Two Years of LHC Operation — S. Myers (CERN)	
The operational performance of the LHC machine both for proton and lead ion operation are reviewed for the period 2010 and up to the present. The beam parameter path allowing the very high rate of collider performance is presented and discussed. The accelerator issues encountered and those somewhat surprisingly not encountered are also discussed. The short and longer term plans for the LHC are also briefly presented.		
21-May-12 11:00 – 11:30	Invited Oral	Hall B (Plenary)
MOYAP — Invited Oral Presentation (Applications of Accelerators)		
Chair: S. Henderson (Fermilab)		
MOYAP01 11:00	Accelerator Driven Systems — D. Vandeplasche (SCK-CEN)	
Accelerator Driven Systems are promising tools for the efficient transmutation of nuclear waste products in dedicated industrial installations (transmuters). The Myrrha project at Mol, Belgium, placed itself on the path towards these applications with a multipurpose and versatile system based on a liquid PbBi (LBE) cooled fast reactor (80 MWth) which may be operated in both critical and subcritical modes. In the latter case the core is fed by spallation neutrons obtained from a 600 MeV proton beam hitting the LBE coolant/target. The accelerator providing this beam is a CW superconducting linac which is laid out for the highest achievable reliability. The combination of a redundant and of a fault tolerant scheme should allow obtaining an MTBF value in excess of 500 hours that is required for optimal integrity and successful operation of the ADS. Myrrha is expected to be operational in 2023. The forthcoming 4-year period is fully dedicated to R&D activities, and in the field of the accelerator they are entirely focused on the reliability aspects.		
21-May-12 11:30 – 12:00	Invited Oral	Hall B (Plenary)
MOYBP — Invited Oral Presentation (Accelerator Technology)		
Chair: S. Henderson (Fermilab)		
MOYBP01 11:30	State-of-the-Art and Future Prospects in RF Superconductivity — K. Saito (KEK)	
This presentation should recount the remarkable progress in improving the performance of superconducting cavities over the past 50 years and explore future directions, including advances in materials other than Nb, such as MgB ₂ and novel multi-layer superconductor-insulator systems. This talk should provide an overview of international activities.		

IPAC 2012 — New Orleans, LA, USA, May 21–25, 2012

7

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Now some examples of what has been done...

Examples (ConTeXt)

16-Aug-04 15:30 - 17:30

MOP — Monday Poster Session

MOP09

Status of the 7 MeV/u, 217 MHz Injector Linac for the Heidelberg Cancer Therapy Facility

B. Schlitt, G. Hutter, F. Klos, C. Muehle, W. Vinzenz (GSI, Darmstadt) A. Bechtold, U. Ratzinger, A. Schempp (IAP, Frankfurt-am-Main) Y.R. Lu (PKU/IHIP, Beijing)

A clinical synchrotron facility for cancer therapy using energetic proton and ion beams (C, He and O) is under construction and will be installed at the Radiologische Universitätsklinik in Heidelberg, Germany, starting in 2005. The status of the ECR ion source systems, the beam line components of the low energy beam transport lines, the 400 keV/u RFQ and the 20 MV IH-cavity as well as the linac rf system will be reported. Two prototype magnets of the linac quadrupole magnets have been built at GSI and have been tested successfully. A test bench for the 1.4 MW, 217 MHz cavity amplifier built by industry has been installed at GSI including a 120 kW driver amplifier which will be used also for high power tests of the RFQ. A test bench for the RFQ using proton beams is presently being set up at the IAP. RF tuning of the 1:2 scaled IH-DTL model as well as Microwave Studio simulations of the model and the power cavity have been also performed at the IAP [1].

[1] Y.Lu, S.Minaev, U.Ratzinger, B.Schlitt, R.Tiede, this conference.

MOP10

The IH Cavity for HITRAP

C. A. Kitegi, U. Ratzinger (IAP, Frankfurt-am-Main) S. Minaev (ITEP, Moscow)

RFQs are already used to decelerate ions beams at low energy. Within the HITRAP facility at GSI a combination of an IH drift tube cavity operating at the H11(0) mode and a 4-rod RFQ is proposed to decelerate the 0.001 ms heavy ions bunches (up to U^{92+}) from 4 A×MeV to 6 keV×A. The operating frequency is 108.408 MHz. The A/q range of the linac is up to 3. A 4 gaps quarter wave resonator will match the 0.001 ms bunches from the ESR into the IH cavity. By applying the KONUS dynamics, the 2.7 meters long IH cavity will perform a high efficiency deceleration by up 11 MV with 200 kW rf power. The beam dynamics performed with the LORASR simulation code will be shown. The transmission limited by the buncher is nearly 30%. An alternative 2nd harmonic bunching section, which allows higher transmission and/or smallest longitudinal emittance, will be discussed. It is aimed to reach an effective shunt impedance around 260 MW/m for the IH cavity. The cavity geometrical parameters estimations and Microwave Studio simulations will be presented.

MOP11

RF Model Measurements and Numerical Simulations for the 20 MV IH-DTL Cavity of the Heidelberg Cancer Therapy Facility

Y.R. Lu, Y.R. Lu, B. Schlitt (GSI, Darmstadt) S. Minaev (ITEP, Moscow) U. Ratzinger, R. Tiede (IAP, Frankfurt-am-Main)

A clinical synchrotron facility for cancer therapy using energetic proton and ion beams (C, He and O) is under construction and will be installed at the Radiologische Universitätsklinik in Heidelberg, Germany, starting in 2005. The different rf tuning concepts and tuning results

54

MOP — Monday Poster Session

16-Aug-04 15:30 - 17:30

MOP12

for an 1:2 scaled IH-DTL model cavity are presented. Microwave Studio simulations have been carried out for the model and for the real power cavity. Results from the model measurements and the field simulations agree very well also for the higher order modes. The beam matching from the RFQ to the IH-DTL was optimised. Beam dynamics simulations using the LORASR code and starting with a particle distribution at the RFQ exit as calculated with PARMTEQ are presented. The IH drift tube array was matched with the gap voltage distribution resulting from rf model measurements.

KONUS Beam Dynamics Design of a 70 mA, 70 MeV Proton CH-DTL for GSI-SIS12

The future scientific program at GSI needs

R. Tiede, G. Clemente, H. Podlech, U. Ratzinger (IAP, Frankfurt-am-Main) W. Barth, L. Groening (GSI, Darmstadt) Z. Li (IMP, Lanzhou) S. Minaev (ITEP, Moscow)

a dedicated proton injector into the synchrotron SIS, in order to increase the proton intensity of the existing UNILAC/SIS12 combination by a factor of 70, resulting in $7 \cdot 10^{12}$ protons in the synchrotron. A compact and efficient 352 MHz RFQ - CH-DTL combination based on novel structure developments for RFQ and DTL was worked out. For DTLs operated in an H-mode like CH-cavities (H210-mode), the shunt impedance is optimized by use of the KONUS beam dynamics. Beam dynamics simulation results of the CH-DTL section, covering the energy range from 3 to 70 MeV, with emphasis on the low energy front end are presented. Optimization aims are the reduction of emittance growth, of beam losses and of capital costs, by making use of the high acceleration gradients and shunt impedance values provided by the Crossbar H-Type (CH) structure. In addition, the beam dynamics design of the overall DTL layout has to be matched to the power limits of the available 352 MHz power klystrons. The aim is to power each cavity by one klystron with a peak rf power of around 1 MW.

Status of A Tuner Development for A 352 MHz Superconducting CH-Cavity

H-Mode cavities have been developed successfully during the last decades for a large

A.C. Sauer, H. Deitinghoff, H. Klein, H. Liebermann, H. Podlech, U. Ratzinger, R. Tiede (IAP, Frankfurt-am-Main)

variety of applications in the field of ion acceleration. The CH-structure is a new H-mode drift tube structure operating in the TE210 mode which is currently under development at the IAP Frankfurt. In this paper we present the status of a tuner development of a superconducting 352 MHz CH cavity prototype which will be delivered and ready for the first cold tests in a vertical cryostat in the middle of this year. Cavity simulations of

- the static tuning sensitivities with some additional niobium blocks inside the cavity, for a rough tuning during fabrication and
- mechanic tuning sensitivities where the resonator end-walls will be stretched and squeezed, for tuning during cold operation with MicroWave Studio will be presented.

Moreover simulations of the transverse and longitudinal mechanic eigenmodes (microphonics) and stress capabilities of the thin-walled resonators with ANSYS will be outlined to calculate the tuning range of a bulk niobium CH-cavity. Finally the results will be discussed.

MOP13

55

Examples (ConTeXt)

12-Sep-07 09:00 - 10:30

WEM1 — Wednesday Morning Session 1

WEM1 — Wednesday Morning Session 1

WEM1C01

Status of the LEPTA Project

A. G. Kobets, E. V. Ahmanova, V. Bykovsky, I. I. Korotaev, V. I. Lokhmatov, V. N. Malakhov, I. N. Meshkov, R. Pivin, A. Yu. Rudakov, A. O. Sidorin, A. V. Smirnov, G. V. Trubnikov (JINR)

The Low Energy Positron Toroidal Accumulator (LEPTA) is under commissioning at JINR. The LEPTA facility is a small positron storage ring equipped with the electron cooling system. The project positron energy is of

4-10 keV. The main goal of the facility is to generate an intense flow of positronium atoms—the bound state of electron and positron. The focusing system of the LEPTA ring after solenoidal magnetic field remeasurement and correction has been tested with pulsed electron beam by elements. Some resonant effects of beam focusing have been observed. The experiments aiming to increase the life time of the circulating electron beam and test the electron cooling electron beam are in progress. Construction of the pulsed injector of the low energy positrons is close to the completion (CPS). The injector is based on ^{22}Na radioactive isotope and consists of the cryogenic positron source, the positron trap and the acceleration section. In the CPS positrons from the ^{22}Na tablet are moderated in the solid neon and transported into the trap, where they are accumulated during about 80 seconds. Then accumulated positrons are extracted by the pulsed electric field and accelerated in electrostatic field up to required energy (the injector as a whole is suspended at a positive potential that corresponds to required positron energy in the range of 4-10 keV). In injection pulse duration is about 300 nsec. The CPS has been tested at the low activity of isotope ^{22}Na tablet (100 MBq). The continuous positron beam with average energy of 1.2 eV and spectrum width of 1 eV has been obtained. The achieved moderation efficiency is about 1 %, that exceeds the level known from literature. The accumulation process in the positron trap was studied with electron flux. The life time of the electrons in the trap is 80 s and capture efficiency is about 0.4. The maximum number of the accumulated particles is $2 \cdot 10^{+8}$ at the initial flux of $5 \cdot 10^{+6}$ electrons per second.

WEM1C02

Optical Stochastic Cooling Experiment at the MIT-Bates South Hall Ring

W. A. Franklin, K. A. Dow, J. P. Hays-Wehle, F. X. Kaertner, R. Milner, R. P. Redwine, A. M. Siddiqui, C. Tschalaer, D. Wang, F. Wang, J. van der Laan (MIT) M. Bai, M. Blaskiewicz, W. Fischer, V. Yakimenko (BNL) W. A. Barletta, A. Zholents, M. S. Zolotorev (LBNL) S.-Y. Lee (IUCF)

An experiment to demonstrate for the first time the principle of optical stochastic cooling* has been proposed using electrons at 300 MeV in the MIT-Bates South Hall Ring. The experiment will operate the Ring in a dedicated mode using a lattice tailored for transverse and longitudinal cooling. The experimental apparatus, including a magnetic chicane, undulator system, and ultrafast optical amplifier, has been designed to be compatible with existing technology. The experiment will study OSC physics to evaluate its prospects for future application at the high energy high brightness frontier and to develop deterministic diagnostics needed to achieve it. Details of the experiment design will be presented along with results from an initial beam feasibility study.

*M. Zolotorev and A. Zholents, Phys. Rev. E 50, 3087 (1994)

28

Chair: D. Prasuhn, FZJ (Jülich)

Author Index

Author Index

A

Ahmanova, E. V. WEM1C01
Alexahin, Y. THM2I04

B

Bai, M. WEM1C02
Barletta, W. A. WEM1C02
Beckert, K. THAP22, FRM1C02
Bell, G. I. WEM2C04
Beller, P. THAP22, FRM1C02
Belochitskii, P. MOM1I02
Ben-Zvi, I. WEM2C04, THAP01, FRM2C06
Bergmark, T. THAP10
Bhat, C. M. THAP06
Blaskiewicz, M. MOA1I01, WEM1C02, WEM2I05
Blondel, A. P. TUM2I05
Boine-Frankenheim, O. THAP02
Bosch, F. G. THA2I01
Brennan, J. M. MOA1I01, WEM2I05
Broemmelsiek, D. R. THAP06
Bruhwiler, D. L. WEM2C04
Bubley, A. V. THAP04
Burov, A. V. MOA2I06, THAP06
Bussmann, M. H. FRM1C02
Bykovsky, V. WEM1C01
Byström, O. THAP10

C

Carli, C. THM1I01
Carlson, K. MOA2I06
Chang, X. FRM2C06

D

Danared, H. THAP10, FRM2C04
Derbenev, Y. S. THM2I05, THAP12
Derwent, P. MOM1I01
Dietrich, J. MOM2C04, TUA1C03, THAP05
Dimopoulou, C. MOM2C05, THAP20, THAP22, FRM2C05
Dolinskii, A. MOA1C03, TUA2C08, THAP20
Dow, K. A. WEM1C02

F

Fadil, H. THM1I02, FRM1C03
Fedotov, A. V. MOM2I03, WEM2C04, THAP01, THAP08, FRM2C06
Fischer, W. WEM1C02
Franklin, W. A. WEM1C02
Franzke, B. MOM2C05, FRM1C02, FRM2C05
Fujimoto, S. THM1I02
Fujimoto, T. THM1I02

G

Geppert, Ch. FRM1C02
Gälnander, B. MOA2C05, THAP10
Goncharov, A. D. THAP05
Gostishchev, V. THAP20
Grieser, M. THM1I02, FRM1I01, FRM1C03

H

Habs, D. FRM1C02
Hasse, R. W. THAP21

Italic papercodes indicate primary author

45

* Examples (ConTeXt)

Program

POW004	Beam Profile Measurements by Using Wire Detectors in J-PARC	36
POW005	Linac and Transfer Line Beam Position Monitor at ELETTRA	36
POW006	First Tests of the Machine Protection System for CTF3	36
POW009	LEIR Beam Instrumentation	37
POW010	A Hardware Simulation Kit for Beam Instrumentation	37
POW011	Accuracy of the SPS Transverse Emittance Monitors	37
POW012	SRAM-Based Passive Dosimeter for High-Energy Accelerator Environments	38
POW013	Beam Position Monitor for the J-PARC Main Ring Synchrotron	38
POW015	First Steps towards the Integration of Photon Beam Position Monitor Signals into the SLS Fast Orbit Feedback	38
POW017	Ultrasound Instrumentation for Beam Diagnostics and Accelerating Structures Control	39
POW018	Investigation of Photo Neutralization Efficiency of High Intensity H ⁺ Beam with Nd:YAG Laser for J-PARC	39
POW019	The LHC Beam Loss Monitoring System's Real-Time Data Analysis Card	39
POW020	The Digital Camera Application in the Taiwan Light Source	40
POW021	Resonant Strip Line BPM for Ultra Low Current Measurements	40
POW022	Turn-by-Turn and Bunch-by-Bunch Diagnostics at NSRRC	40
POW023	BPM System and its Development for the Storage Ring of NSRRC	40
POW024	Diagnostics for the 1.5 GeV Transport Line at the NSRRC	41
POW025	Towards a Robust Phase Locked Loop Tune Feedback System	41
POW026	Beam Loss Position Monitor Using Cerenkov Radiation in Optical Fibers	41
POW027	Beam Position Monitor and Kicker for the SPring-8 Transverse Bunch-by-bunch Feedback	42

ITWA — Wednesday Afternoon Invited Talk

ITWA01	Low Energy High Brilliance Beam Characterization	43
--------	--	----

CTWA — Wednesday Afternoon Contributed Talk

CTWA01	High Sensitivity Tune Measurement by Direct Diode Detection	44
CTWA02	Radiation Tests on Solid State Cameras for Instrumentation	44

Author Index

ITMM — Monday Morning Invited Talk

06-Jun-05 09:00 - 12:30

ITMM — Monday Morning Invited Talk

Instrumentation in Small Low Energy Machines

Low energy particle accelerators are used either as injector for higher energy machines or as dedicated machines for special purposes.

U. Raich (CERN)

These may be industrial, medical or prototype machines for testing new accelerating schemes. Low energy beams open measurement possibilities not available at higher energies due to the low magnetic rigidity of the particles and due to their small penetration depth. On the other hand these beams also represent special challenges due to their high energy deposition in matter, space charge problems etc. which are not seen at higher energies. Measurement principles typical for small accelerators will be presented and explained with the help of example implementations.

Commissioning of SNS Beam Instrumentation*

The Spallation Neutron Source (SNS) is an accelerator-based neutron facility under construction in Oak Ridge, Tennessee. The

T.J. Shea (ORNL)

project is a collaboration of 6 partner laboratories: Lawrence Berkeley (LBNL), Los Alamos (LANL), Argonne (ANL), Brookhaven (BNL), Jefferson (Jlab), and Oak Ridge (ORNL). To achieve the performance goals, the SNS accelerator facility must deliver over one megawatt of beam power to a mercury target. This talk will describe the beam diagnostic instrumentation required to commission and operate such a facility at high beam power. Status of the SNS construction and recent beam commissioning results will also be presented.

Beam Halo Observation by Coronagraph

We developed a coronagraph to observe the image of the beam halo, or tail, surrounding the beam. The concept of the coronagraph

T. Mitsuhashi (KEK)

was invented by B.F. Lyott for the observation of sun coronas. In the coronagraph, an opaque disk is placed in the image plane of an objective lens to block the glare of the sun image. The diffracted light is eliminated by re-diffraction optics with a Lyott stop. We used this coronagraph to observe the beam halo. A great advantage in using the coronagraph is that we can observe the two-dimensional spatial distribution of the beam halo via its image. The re-diffraction optics of the coronagraph is optimized for the observation of beam halo. The optical polishing of the objective lens is one of most critical points in the observation of a weak halo or tail. With a very well-polished lens, we succeeded in obtaining a background-to-peak intensity ratio better than 10^{-6} . As a demonstration, we observed the beam tail at the Photon Factory storage ring. We succeeded in observing an image of the non-Gaussian tail surrounding the beam, with an intensity range down to 1/104 of the peak intensity.

* Examples (Designer work - FEL2010)

August 24

August 24

Abstract

08:30
|
10:00
Storage Rings and ERL FELs
Chair: S.V. Benson, JLAB (Newport News, Virginia)

TUOA11 Radiation from laser-modulated and laser-sliced electron bunches in UVSOR-II

M. Katoh (UVSOR)

Coherent synchrotron radiation (CSR) has been intensively investigated because of its potential ultrahigh power in the terahertz (THz) region. CSR is emitted not only from short electron bunches but also from bunches with longitudinal microstructure of radiation wavelength scale. Laser slicing is a technique for creating sub-mm dip structure on electron bunches circulating in a storage ring. Such a bunch emits broadband CSR of sub-ps duration. More generally, in principle, one can produce arbitrary density structures by the laser electron interaction. As a useful example, periodic density structures can be produced by using amplitude-modulated laser pulses. The period of the structure can be varied by changing the period of the amplitude modulation. The first successful demonstration was conducted at UVSOR-II. The electron bunch with the periodic density modulation emitted monochromatic and tunable THz-CSR in a bending magnet. In this talk, some latest results from the THz CSR experiments with laser modulation technique at UVSOR-II will be presented, including the direct measurement of the CSR electric field and beam dynamics of the micro-density structures on electron bunches.

TUOA12 The Elettra Storage-Ring Free-Electron Laser: a Source for FEL Studies and User Experiments

G. De Ninno, E. Allaria, M.B. Danailov, E. Karantzoulis, C. Spezzani, M. Trovò (ELETTRA) M. Coreno (CNR-IMIP) G. De Ninno (University of Nova Gorica) E. Ferraioni (Università degli Studi di Trieste) G. Geloni (European XFEL GmbH)

The paper will report about the last achievements of the Elettra storage-ring FEL. The latter include: a) a noticeable improvement of the source performance (generation of coherent radiation at 87 nm, attainment of a very good shot-to-shot stability); b) general FEL studies, relevant to single-pass devices (characterization of the angular distribution of harmonic emission, analysis of the frequency pulling effect), and c) first user experiments (pump-probe on gas phase and solid-state samples).

TUOA3 Feasibility Study of Short-Wavelength and High-Gain EFLs in an Ultimate Storage Ring

K. Tsumaki (JASRI/SPring-8)

In recent years ultimate storage ring has been studied aiming at ultra-small emittances and ultra-bright synchrotron radiation. Z. Hung et al.* studied an FEL in the EUV and soft x-ray regions in one of such rings as PEPX 4.5 GeV storage ring and showed that the three orders of magnitude improvement in the average brightness is possible at these radiation wavelengths. We studied an ultimate storage ring that has 0,034 nm-rad natural emittance and 5.4 MeV energy spread at 6 GeV**. The normalized emittance is 0.2 μ m-rad with full coupling and the relative energy spread is 0.089 %. As smaller beam emittances and higher beam energy have possibilities of shorter wavelength FELs, we studied the feasibility of high-gain FELs in the range of x-ray regions as well as soft x-ray regions. In this paper we present the results of analysis and simulation of high-gain FEL in the ultimate storage ring.

Abstract

TUOA4 Use Of Multipass Recirculation And Energy Recovery In CW SRF X-FEL Driver Accelerators

D. Douglas, W. Akers, S.V. Benson, G.H. Biallas, K. Blackburn, J.R. Boyce, D.B. Bullard, J.L. Coleman, C. Dickover, F.K. Ellingsworth, P. Entusbenko, S. Fisk, C.W. Gould, J.G. Gubeli, F.E. Hannon, C. Hernandez-Garcia, K. Jordan, J.M. Klepf, R. Li, M. Marchlik, S.W. Moore, G. Neil, T. Powers, D.W. Sexton, I. Shin, M.D. Shinn, C. Tennant, R.L. Walker, G.P. Williams, F.G. Wilson, S. Zhang (JLAB) B. Terzic (Thomas Jefferson National Accelerator Facility (JLAB))

We discuss the use of multipass recirculation and energy recovery in CW SRF drivers for short wavelength FELs. Benefits include cost management (reduced system footprint, RF and SRF hardware, and associated infrastructure such as cryogenic systems), ease in radiation control (low exhaust drive beam energy), ability to accelerate and deliver multiple beams of differing energy to multiple FELs, and opportunity for seamless integration of multistage bunch length compression into the longitudinal matching scenario. Issues include those associated with ERLs, compounded by the challenge of generating and preserving the CW electron beam brightness required by short wavelength FELs. We thus consider the impact of space charge, BBU and other environmental wakes and impedances, ISR and CSR, potential for microbunching, intra-beam and beam-residual gas scattering, ion effects, RF transients, and halo, as well as the effect of traditional design, fabrication, installation and operational errors (lattice aberrations, alignment, powering, field quality). Context for the discussion is provided by JLAMP, the proposed VUV/X-ray upgrade to the existing Jefferson Lab FEL.

10:30
|
12:30
X-Ray and Short Wavelength FELs
Chair: Z. Huang, SLAC (Menlo Park, California)

TUOB1 LCLS-II: An Upgrade for the Linac Coherent Light Source

J. Wu (SLAC)

The success of LCLS [1] generates strong motivation and solid technical basis to extend its capabilities. The upgrade will extend x-rays wavelength range down to 0.06 nm. A new soft x-ray adjustable-gap undulator line will produce FEL with wavelengths up to 6 nm. To allow full electron beam rate and independent electron beam parameters in each line, a new injector and pair of bunch compressors will be added to the second kilometer of SLAC linac. The electron from this linac part will bypass the LCLS accelerator into the soft x-ray undulators which can provide two FEL pulses with variable delay and photon energy and may be configured for narrow bandwidth pulse via self-seeding. External seeding with the echo-enabled harmonic generation can improve temporal coherence. The new bypass line can add multiple electron bunches within each RF pulse. LCLS-II will provide polarization control and can incorporate the low-charge, few-femtosecond pulse duration operating mode. A THz radiation source will be included to provide x-ray/THz pump-probe capabilities. The schemes and parameters are based on measurements and experience at LCLS.

TUOB2 FLASH Upgrade and First Results

S. Schreiber (DESY)

The free-electron laser facility FLASH at DESY, Germany finished its very successful 2nd user period late summer 2009. Recently FLASH has been upgraded. The 3rd user

*Examples (Designer work - FEL2010)

List of Authors

Dickover, C.
Ding, Y.T. TUOA4
MOPB28, MOPC16, TUOB4, WEOB3, WEPB32, WEPB33,
THPC21, THOC12
WEPB38, THPC08, THPC09
WEPB30, WETUI1
Donohue, J.T. MOPB23, TUPA07
Doolittle, L.R. WEPB36, THOA11
Douglas, D. MOPA09, TUOA4
Dovzhenko, B.A. WEPB31
Dowell, D. MOPA09, MOOA11, WEPB33
Drescher, M. TUPB20, TUPB22, WEOAI2
Du, Y.-C. WEPB13
Düsterer, S. MOPA01, TUPB22, WEOAI2
Dumitrascu, M. THPC07
Dunning, D.J. MOPA08, MOPB32, THPB21
Dunning, D.P. WEOA3
Duran Yildiz, H. MOPA10, MOPA11, TUPA17
Dziarzhyski, S. THPC15

— E —

Ebbers, C.A. THPB05
Eckoldt, H.-J. MOPA01
Edwards, H.T. MOPC13, WEPB01
Eikema, K. MOPC22
Ellingsworth, F.K. TUOA4
Emma, P. MOOA12, MOPC14, TUOB4, TUPB08, WEOB3, WEPB33,
THPC21, THOC12
WEPB11, WEPB34
Eriksson, M. TUPB15, WEOA4
Erny, C. THPB12
Esarey, E. TUPA04, TUPA23, TUPB28, THPB27
Evain, C. THPB18
Evdokimov, V.A. MOOA16, TUOA4, WEPB04
Evtushenko, P.

— F —

Faatz, B. MOPA01, MOPC09, THPB15
Fajardo, M. TUPB19
Falcone, R.W. MOPA06
Farokhi, B. MOPB24, MOPB25
Faure, J. THPB19
Fawley, W.M. MOPB01, MOPC03, TUPA12
Fedotov, A.V. TUPA21
Fedurin, M.G. TUPA21
Felber, M. THOA12, THOA3, THPA04, THPA05, THPA06

List of Authors

Feldhaus, J. MOOB4, MOPA01, MOPC09, TUPB22, WEOAI2
Feldman, D.W. WEPB12
Feng, C. TUOB3, TUPB05, TUPB07, THPB16, THPB17
Feng, J. WEPB35, WEPB36
Feng, Y. TUPB10
Ferguson, K.L. MOPA04, WEPB28
Ferlanis, M. WEPB41
Ferrari, E. TUOA12, TUPA27
Ferrario, M. MOPB20, WEPB27, TUPB18
Ferry, S. WEPB40
Ficcadenti, L. TUPB18, WEPB27
Filhol, J.-M. TUPA23
Filippetto, D. TUPB18, WEPB27, MOPA06, WEPB35, WEPB36
Fisk, S. TUOA4
Floettmann, K. WEPB05
Follath, R. MOPA01
Frassetto, F. TUPB18
Freund, W. THPC03
Frisch, J.C. TUOB4, WEPB33, THOA11, THPA10, THPC21, THOC12,
THTUI1
THPC10
THOB11
Froehlich, L. THOB11
Fuchs, M. FROB3
Fukuzawa, H. THPA11
Fullagar, W.K.

— G —

Gaarde, M.B. TUPB15
Gaio, G. WEPB41
Gallo, A. TUPB18, WEPB27
Gallot, G. THPB19
Gandhi, P.R. TUOC12
Ganter, R. WEPB14
Gardelle, J. MOPB23, TUPA07
Garvey, T. MOOB3, THPA08
Gatti, G. TUPB18, WEPB27
Gautier, J. TUPB19
Geloni, G. MOPB22, TUOA12, TUPB02, WEPB14, THPA02, THPA03
Geng, H. TUPB24
Gensch, M. MOPA01
Gerasimova, N. THPC15
Gerstl, S. THPC06
Gerth, C. MOPC08
Gessler, P. THOA12, THOA3, THPA04, THPA05, THPA06
Getmanov, Ya.V. WEPB31

*Examples (Designer work - FEL2010)

MOTU	Tutorial	
MOTUI1	How an FEL Works	35
TUOA	Storage Rings and ERL FELs	
TUOA1	Radiation from laser-modulated and laser-sliced electron bunches in UVSOR-II	36
TUOA12	The Elettra Storage-Ring Free-Electron Laser: a Source for FEL Studies and User Experiments	36
TUOA3	Feasibility Study of Short-Wavelength and High-Gain EFLs in an Ultimate Storage Ring	36
TUOA4	Use Of Multipass Recirculation And Energy Recovery In CW SRF X-FEL Driver Accelerators	36
TUOB	X-Ray and Short Wavelength FELs	
TUOB1	LCLS-II: An Upgrade for the Linac Coherent Light Source	37
TUOB12	FLASH Upgrade and First Results	37
TUOB3	A Comparison Study of High Harmonic Characterizations in EEHG Operation of SDUV-FEL	38
TUOB4	Second and Third Harmonic Measurements at the Linac Coherent Light Source	38
TUPA	Poster: Storage ring & ERL / FEL oscillator & Long Wavelength	
TUPA02	A Laser-Activated Plasma Switch for Extraction of Single FELBE Radiation Pulses	38
TUPA03	A Tapered-Undulator Experiment at the ELBE FIR Oscillator FEL	39
TUPA04	Control of Instability Induced by a Detuning in FEL Oscillator	39
TUPA05	Mode-Stability in FEL Oscillators	39
TUPA06	A High Power CW mm-THz Wave Source Based on Electrostatic Accelerator FEL	40
TUPA07	Dependence of Gain on Current in the Coherent Smith-Purcell Experiment at Cesta	40
TUPA08	Ultra-Compact Smith-Purcell Free-Electron Laser	41
TUPA09	Power Enhancement of the Low Frequency Branch in a Short Pulse Waveguided FEL	41
TUPA10	Stabilization of the Bunch Repetition Rate for a Compact Terahertz FEL Driven by a Microtron	41
TUPA11	THz Free-Electron Laser Optical Design and Simulations	42
TUPA12	XFEL Oscillator Simulation Including Angle-Dependent Crystal Reflectivity	42
TUPA14	Terahertz Band Free Electron Lasers With Hybrid Bragg Reflectors	42
TUPA15	Conceptual Design of a Table-Top THz Free-Electron Laser for Security Inspection	43
TUPA16	THz Free-Electron Laser Based on FEL Oscillator Scheme	43

TUPA17	Present Status of the TAC IR-FEL Facility & Experimental Stations	43
TUPA18	Analysis of the Start-up Phase of an FEL With a Partial Waveguide Resonator	43
TUPA19	Improvement of a Smith-Purcell Free-electron Laser	44
TUPA20	Study on a Compact Smith-Purcell Free-electron Laser	44
TUPA21	CSR Shielding Experiment	44
TUPA22	FEL Potential of eRHIC	45
TUPA23	Femtosecond Coherent Synchrotron Radiation at SOLEIL, Using a Two-Laser-Electron Interaction Scheme	45
TUPA25	Steady State Microbunching in a Storage Ring to Produce Coherent Radiation	45
TUPA26	Characteristics of Inverse Compton X-Rays Generated Inside the NIJI-IV Free Electron Laser Oscillators	45
TUPA27	Preliminary Studies for the Implementation of Femto-Slicing at the Elettra Storage Ring	46
TUPA28	13.5-nm Free-Electron Laser for EUV Lithography	46
TUPA29	Design of a Multi-Turn ERL for Hybrid K-Edge Densitometer	46
TUPB	Poster: Seeding and Seeded FELs	
TUPB01	Noise and Coherence Propagation in Multi-Stage FELs: Application to Echo-Enhanced Harmonic Generation	47
TUPB02	A Simple Method for Controlling the Line Width of SASE X-Ray FELs	47
TUPB03	Experiments on the Tuning of Seeded FELs Through Frequency Pulling	47
TUPB04	High Harmonic Sources for Seeding of FERMI@Elettra	48
TUPB05	Simulation Studies for the EEHG Experiments at the SDUV-FEL	48
TUPB06	Some Experimental Results of EEHG(Echo Enabled Harmonic Generation) at SINAP	48
TUPB07	Numerical Investigations of Laser-Beam Interaction in an Undulator	48
TUPB08	Staged Self-Seeding Scheme for Narrow Bandwidth, Ultra-Short X-ray Harmonic Generation Free Electron Laser at LINAC Coherent Light Source	49
TUPB10	Optics for Self-Seeding Soft X-ray FEL Undulators	49
TUPB11	Noise Amplification in HHG Seeding	49
TUPB12	Noise Amplification in Echo-Enabled Harmonic Generation (EEHG)	50
TUPB13	Echo-Seeding Options for LCLS-II	50
TUPB15	Metrology of High Order Harmonics for FEL Seeding	50
TUPB16	Numerical Study on Coherent Harmonic Generation Free Electron Laser Seeded by Chirped External Laser	50
TUPB17	Generation of Atto-Second Water Window Coherent X-Ray Radiation Through Modulation Compression	51
TUPB18	FEL Experiments at SPARC	51
TUPB19	Generation of High Harmonics in Elliptical Polarization	52
TUPB20	Present Status and Commissioning Results of sFLASH	52
TUPB21	Characterization of Seeded FEL Pulses at FLASH: Status, Challenges and Opportunities	52
TUPB22	The XUV Injection Beam Line for Direct Seeding at sFLASH	53

* Examples (Abstract booklet HB2012)

WE01A04 Review of longitudinal instabilities in the SPS and beam dynamics issues with high harmonic RF systems in accelerators	31
WEO3A — Working Group-C	33
WE03A01 High energy electron cooling	33
WE03A02 Beam Loss and Collimation in the ESS Linac	33
WE03A03 Extraction, Transport and Collimation of the PSI 1.3 MW Proton Beam	33
WE03A04 Current and Planned High Proton Flux Operations at the FNAL Booster	33
WEO1B — Working Group-A	34
WE01B01 Low gamma transition optics for the SPS: simulation and experimental results for high brightness beams	34
WE01B02 Optics design optimization for IBS dominated beams	34
WE01B03 Space charge suppression for flat beams	34
WE01B04 Scaling properties of resonance crossing in non-scaling FFAGs	34
WE01B05 PTC-ORBIT Studies for the CERN LHC Injectors Upgrade Project	34
WEO3B — Working Group-B	35
WE03B01 FRIB Accelerator Beam Dynamics Design and Challenges	35
WE03B02 Acceleration and Transport of Multi-Charges Ions through EBIS Pre-injector	35
WE03B03 PXIE at FNAL	35
WE03B04 RFQ Beam Dynamics Design for Large Science Facilities and Accelerator-Driven Systems	35
WE03B05 Using step-like nonlinear magnets for beam uniformization at IFMIF target	35
WEO1C — Working Group-A	37
WE01C01 Effect of self-consistency on periodic resonance crossing	37
WE01C02 Simulation and Measurement of Half Integer Resonance in Coasting Beams in the ISIS Ring, with a Summary of Some Related High Intensity Effects	37
WE01C03 Longitudinal Beam Loss Studies of the CERN PS-to-SPS Transfer	37
WE01C04 Acceleration of High-Intensity Protons in the J-PARC Synchrotrons	37
WE01C05 Longitudinal Space Charge Phenomena in an Intense Beam in a Ring	37
WE01C06 Observation and Simulation of Beam-Beam Effects in LHC	38
WEO3C — Working Group-C	39
WE03C01 Injection and Stripping Foil Studies for a 180 MeV Injection Upgrade at ISIS	39
WE03C02 Collimation of Ion Beams	39
WE03C03 Beam halo dynamics and control with hollow electron beams	39
WE03C04 Long Baseline Neutrino Experiment (LBNE) Target Material Radiation Damage Studies Using Energetic Protons of the Brookhaven Linear Isotope Production (BLIP) Facility	39
WE03C05 Radiation Effect Modeling at Intensity Frontier: Status and Uncertainties	39
WE03C06 Understanding Ion Induced Radiation Damage in Target Materials	40
THO1A — Working Group-A	41
THO1A01 Beam-Beam Effects in RHIC	41
THO1A02 Effects of Magnetic Field Tracking Errors and Space Charge on Beam Dynamics at CSNS/RCS	41
THO1A03 Dual-Harmonic Acceleration Studies at CSNS RCS	41
THO1A04 High Intensity Longitudinal Dynamics Studies for an ISIS Injection Upgrade	41
THO3A — Working Group-B	42
THO3A01 High intensity aspects of J-PARC linac, including re-commissioning after earthquake	42
THO3A02 Beam Dynamics of China ADS Linac	42
THO3A03 Simulations and measurements in high intensity LEBT with space charge compensation	42
THO3A04 Definition of the beam halo and its consequences	42
THO1B — Working Group-A	43
THO1B01 A Quest for a Superior Ion Beam for a High Luminosity Electron-Ion Collider	43
THO1B02 Test of Optical Stochastic Cooling in Fermilab	43
THO1B03 Measurement of optics errors and space charge effect	43
THO1B04 Space Charge Effects in the NICA Collider Rings	43
THO1B05 Broad-band transverse feedback against e-cloud or TMCI: Plan and status	43
THO3B — Working Group-C	45
THO3B01 Proton Beam Inter-Bunch Extinction and Extinction Monitoring for the Mu2e Experiment	45
THO3B02 SRF Technology Challenge and Development	45
THO3B03 SRF cavity research for Project X	45
THO3B04 Beam Dynamics Studies of H ⁻ Beam Chopping in a LEBT for Project X	45
THO3B05 Intense High Charge State Heavy Ion Beam Production for the Advanced Accelerators	45
THO1C — Working Group-D	47
THO1C01 High Intensity Operation and Controlling Beam Losses in a Cyclotron Based Accelerator	47
THO1C02 Beam Loss Control in the ISIS Accelerator Facility	47
THO1C03 Collimation experience at the LHC	47

17-Sep-12 09:10 – 10:20	Oral	Main Hall
MO11A — Invited Plenary - Session A		

Plenary

MO11A01
09:10

LHC - challenges in handling beams exceeding 100 MJ – R. Schmidt (CERN)

The Large Hadron Collider (LHC) at CERN operates at 4 TeV with high intensity beams, with bunch intensities exceeding the nominal value by several 10 %. The energy stored in each beams is beyond 130 MJ, less than a factor of three from the nominal value at 7 TeV. With these parameters, operation entered into a regime where various effects due to high intensity bunches are observed (instabilities, beam-beam effects, e-cloud effects). The highly efficient collimation system limits beam losses that threaten to quench superconducting magnets. The correct functioning of the machine protection systems is vital during the different operational phases, where already a small fraction of the stored energy is sufficient to damage accelerator equipment or experiments in case of uncontrolled beam loss. Safe operation in presence of such high intensity proton beams is guaranteed by the interplay of many different systems: beam dumping system, beam interlocks, beam instrumentation, equipment monitoring, collimators and absorbers. The experience gained with the key systems of LHC machine protection and collimation will be discussed.

MO11A02
09:45

J-PARC Recovery Status – K. Yamamoto (JAEA/J-PARC)

J-PARC facilities were seriously damaged by the Great East Japan Earthquake in March 2011, but all facilities resumed a beam operation from December 2012. We report the operation status of J-PARC accelerators after the earthquake.

* Examples (Abstract booklet HB2012)

Igarashi, S. TH01C06
Ikegami, M. MOP231, TH03A01, TH03C04
Ishii, Y. MOP209, MOP210
Ishii, K. TH01C06
Ito, K. TU01A04

— J —

Jacquet, D. WE01C06
Jago, S.J.S. WE03C01
Jakobsen, S. WE01A02
Jang, J.-H. TH01C05
Jansson, A. MOP236, MOP238
Jaussi, M. MOP239
Ji, Q. TH03B04
Jia, H. MOP229
Jiang, C. TU03B05
Jiang, H. MOP218
Jin, J.M. MOP228
Johansson, A.J. MOP238
Johnson, D.E. TU01B02
Johnstone, C. MOP258
Jones, B. WE01C02, WE03C01, TH01C02
Jones, O.R. MOP245

— K —

Kain, V. MOP242, MOP248, MOP245
Kamikubota, N. TH01C06
Karns, P.R. TU01C06
Katayama, T. TH01B04
Kaufmann, W. TU01C05
Kellher, D.J. MOP256
Kephart, R.D. TH03B03
Kester, O.K. M011B01, M011B01, MOP205, MOP207
Kim, D.J. TH01C05
Kim, H.S. TH01C05
Kishek, R.A. MOP260, WE01C05
Koeth, T.W. WE01C05
Koseki, T. TH01C06
Kostromin, S.A. TH01B04
Kotanyan, A. MOP201
Kowina, P. TU01C05, TH03C02
Kozlov, O.S. TH01B04
Kuhn, M. MOP248
Kuriyama, Y. MOP209, MOP210
Kwon, H.-J. TH01C05

— L —

Lagniel, J.-M. TU03A03
Lagrange, J.-B. MOP209
Lallement, J.-B. TU03B03
Lambert, A.R. TH03B04
Lang, K. TU01C05
Lanza, G. WE01A02
Lapierre, A. TU01B05
Lari, L. MOP245, WE01A02
Lebedev, V.A. M011B03, WE03B03, TH01B02
Lechner, A. MOP203, TU01C04
Lee, S.-Y. WE01B04
Leitner, D. TU01B05
Letchford, A.P. MOP254
Li, C. MOP230, MOP232

Li, C.S. MOP228
Li, D. TH03B04
Li, G.H. TU03B05
Li, J. MOP263, TU01B03
Li, L. MOP228
Li, P. TU01B03
Li, X. MOP214
Li, Y. MOP216
Li, Y.M. TH01C05
Li, Z. M011C01, MOP212, MOP217, MOP219, MOP220,
MOP221, MOP222, TH03A02
Liu, H.C. TU03B04, TU03C05
Liu, H.J. MOP227
Liu, S.H. MOP232
Liu, Y. MOP231, MOP224
Liu, Y.D. WE01A03
Lohmann, W. MOP203
Lombardi, A.M. TU03B03
Long, W. MOP214
Lu, Y.Y. MOP225
Lumpkin, A.H. TH03C01
Luo, H.L. MOP224, MOP225, MOP226, MOP227, MOP228
Luo, Y. TH01A01

— M —

Macpherson, A. WE01C06
Maglioni, C. MOP241
Makino, K. MOP258
Mallows, S. TH03C05
Mao, R.S. TU01B03
Mariani, N. MOP240
Martí, F. WE03B01
Martini, M. WE01B05
Maruta, T. TH03C04
Mascoli, D. MOP208
Masi, A. MOP240
Mastoridis, T. MOP239, MOP247, TH01C04, WE01A02
Meddahi, M. MOP242, TU01A01
Mehler, M. MOP205
Meng, C. MOP219, MOP219, MOP221, TH03A02
Meshkov, I.N. TH01B04
Mete, O. MOP242
Métal, E. TU01A01, WE01A01, WE01B05, TH01D01, WE01A02
Métal, G. TU01A01
Mezger, A.C. TH01C01
Migliorati, M. TU01A01, WE01A01
Mikulec, B. MOP242, MOP248, MOP249, TU01A01
Miracoli, R. MOP208
Miyamoto, R. WE03A02, WE01C06
Mo, Y. WE01C05
Mohri, A. TU01A04
Mokhov, N.V. WE03C04, WE03C05
Molendijk, J.C. MOP239
Molodozhentsev, A.Y. TU01A01, WE01B01, WE01B05
Montag, C. TH01A01
Montesano, S. TU03A02
Mori, Y. MOP209, MOP210
Mounet, N. MOP247, WE01A02
Moyrei, P. MOP240
Müller, G.J. MOP246
Müller, U. TH03C06

* Examples (Program booklet HB2012)

Tuesday, 18-September-2012

18-Sep-12	10:50–12:30	Ballroom
TU01B — Working Group-A&C		
Chair: H.W. Zhao (IMP)		

- TU01B01** 10:50 **Beam Loss Due to Foil Scattering in the SNS Accumulator Ring**
J.A. Holmes (ORNL), M.A. Plum (ORNL)
- TU01B02** 11:10 **Injection Design for Fermilab Project X**
D.E. Johnson (Fermilab)
- TU01B03** 11:30 **Study of Intense Beam Injection and Extraction of Heavy Ion Synchrotron**
Y.J. Yuan (IMP), W.P. Chai, J. Li, P. Li, R.S. Mao, J.W. Xia, J.C. Yang, X.D. Yang, H.W. Zhao (IMP)
- TU01B04** 11:50 **Beam Loss Control for the Fermilab Main Injector**
B.C. Brown (Fermilab)
- TU01B05** 12:10 **The Design and Commissioning of the Accelerator System of the Rare Isotope Reaccelerator - ReA3 at Michigan State University**
X. Wu (FRIB), B. Durickovic, M.J. Syphers, W. Wittmer (FRIB), A. Lapierre, D. Leitner, G. Perdikakis, J.A. Rodriguez, S. Schwarz (NSCL)

12:30–14:00 Lunch *Restaurant »Solid Dining«*

18-Sep-12	10:50–12:30	Meeting Room 3
TU03B — Working Group-B		
Chair: S. Fu (IHEP)		

- TU03B01** 10:50 **Beam Dynamics Design of ESS Warm Linac**
M. Comorian (INFN/LNL)
- TU03B02** 11:10 **Beam Dynamics of the ESS Superconducting Linac**
M. Eshraqi (ESS)
- TU03B03** 11:30 **Linac4 Beam Dynamics and Commissioning Strategy**
J.-B. Lallemand (CERN), G. Bellodi, A.M. Lombardi, P.A. Posocco (CERN)
- TU03B04** 11:50 **End to End Beam Dynamics and Design Optimization for CSNS Linac**
J. Peng (IHEP), S. Fu, H.C. Liu, X. Yin (IHEP)
- TU03B05** 12:10 **Beam Dynamics of the 13 MeV/50 mA Proton Linac for the Compact Pulsed Hadron Source at Tsinghua University**
Q.Z. Xing (TUB), C. Jiang, C.-X. Tang, H.Y. Zhang, S.X. Zheng (TUB), X.L. Guan (Tsinghua University) G.H. Li (NUCTECH)

12:30–14:00 Lunch *Restaurant »Solid Dining«*

Tuesday, 18-September-2012

18-Sep-12	14:00–16:30	Ballroom
TU01C — Working Group-E		
Chair: R. Doelling (PSI) & N. Hayashi (J-PARC)		

- TU01C01** 14:00 **Recent Developments on High Intensity Beam Diagnostics at SNS.**
W. Blokland (ORNL)
- TU01C02** 14:20 **Online Monitoring System for the Waste Beam in the 3 GeV RCS of J-PARC**
P.K. Saha (JAEA/J-PARC), H. Harada, S. Hatakeyama, N. Hayashi, H. Hotchi, K. Yamamoto, M. Yoshimoto (JAEA/J-PARC)
- TU01C03** 14:40 **The Beam Diagnostics of CSNS**
T.G. Xu (IHEP)

15:00–15:30 Coffee

- TU01C04** 15:30 **Detection of 'Unidentified Falling Objects' at LHC**
E. Nebot Del Busto (CERN), F.V. Day, B. Dehning, E.B. Holzer, A. Lechner, R. Schmidt, J. Wenninger, C. Zamantzas, M. Zerlauth, F. Zimmermann (CERN), T. Baer (University of Hamburg), M. Hempel (BTU)
- TU01C05** 15:50 **Measurements and Interpretation of the Betatron Tune Spectra of High Intensity Bunched Beam in the SIS18**
R. Singh (GSI), O. Boine-Frankenheim, O. Chorniy, P. Forck, W. Kaufmann, P. Kowina, K. Lang (GSI), T. Weiland (TMEF TU Darmstadt)
- TU01C06** 16:10 **Instrumentation Developments and Beam Studies for the Fermilab Proton Improvement Plan Linac Upgrade and New RFQ Front-End**
V.E. Scarpine (Fermilab), D.S. Bollinger, K.L. Duel, N. Eddy, P.R. Karns, W. Pellico, C.-Y. Tan, R.E. Tomlin (Fermilab)

16:40–18:00 WG-E Discussions *R. Doelling (PSI)* Ballroom

* Examples (Conference Guide & Abstracts

Monday, 10 October, 2011

10-Oct-11	15:30 – 16:20	Plenary Oral	Auditorium
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MODAU — Process Tuning and Feedback Systems

Chair: M. Lanza (ELETTRA)

MODAU001
15:30

TMT Adaptive Optics Computing Challenges – C. Boyer (TMT), B.L. Ellerbrook, L. Gilles, L. Wang (TMT) S. Browne (The Optical Sciences Company) G.J. Hovey (DRAO)

The Thirty Meter Telescope (TMT) will be used with Adaptive Optics (AO) systems to allow near diffraction-limited performance in the near-infrared and achieve the main TMT science goals. Adaptive optics systems reduce the effect of the atmospheric distortions by dynamically measuring the distortions with wavefront sensors, performing wavefront reconstruction with a Real Time Controller (RTC), and then compensating for the distortions with wavefront correctors. The requirements for the RTC subsystem of the TMT first light AO system will represent a significant advance over the current generation of astronomical AO control systems. Memory and processing requirements would be at least 2 orders of magnitude greater than the currently most powerful AO systems using conventional approaches, so that innovative wavefront reconstruction algorithms and new hardware approaches will be required. In this paper, we will first present the requirements and challenges for the RTC of the first light AO system, together with the algorithms that have been developed to reduce the memory and processing requirements, and then two possible hardware architectures based on Field Programmable Gate Array (FPGA).

MODAU002
15:50

Global Real Time Functions of the "Plasma Syste": Plasma Control and Machine Protection – F. Sartori (F4E), M. Cavinato (F4E) G. De Tommasi (CREATE) A. Neto (IPEN)

One of the most promising lines of research in the area of energy generation by means of nuclear fusion is Tokamak high temperature magnetic fusion. Tokamak devices are complex machines where very hot plasma is formed, controlled and heated thanks to collaboration of several systems. Many of these systems are involved directly with the management of the plasma and the reaching of the target fusion performances: diagnostics, machine instrumentation, plasma heating systems, and magnets. Especially close and real-time coordination among these systems and the plasma is required for safe and efficient operation of the device. This overall "plasma syste" has recently emerged as one of the most important areas of research and development as performance in a large and advanced tokamak device strongly depends on it. This talk will first provide an introductory overview to the "plasma syste" especially highlighting its most important requirements. The focus will then be then given to the functions required to support real time coordination among the systems: plasma control and machine protection. The talk will try to exemplify the range of problems encountered in this area using JET experience as a model. Finally an example of present architecture and a methodology addressing the above problems will be presented.

8

Grenoble, France, 9–14 October, 2011

Monday, 10 October, 2011

10-Oct-11	17:00 – 17:30	Mini oral	Auditorium
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MOMAU — Mini Orals A

Chair: J.M. Meyer (ESRF)

Data and information management

MOMAU002

Improving Data Retrieval Rates Using Remote Data Servers – T. D'Ottavio (BNL), B. Frak, J. Morris, S. Nemesure (BNL)

The power and scope of modern Control Systems has led to an increased amount of data being collected and stored, including data collected at high (kHz) frequencies. One consequence is that users now routinely make data requests that can cause gigabytes of data to be read and displayed. Given that a users patience can be measured in seconds, this can be quite a technical challenge. This paper explores one possible solution to this problem - the creation of remote data servers whose performance is optimized to handle context-sensitive data requests. Methods for increasing data delivery performance include the use of high speed network connections between the stored data and the data servers, smart caching of frequently used data, and the culling of data delivered as determined by the context of the data request. This paper describes decisions made when constructing these servers and compares data retrieval performance by clients that use or do not use an intermediate data server.

MOMAU003

The Computing Model of the Experiments at PETRA III – T. Kracht (DESY), M. Flemming, T. Nunez, A. Rothkirch, F. Schluenzen, P. van der Reest (DESY)

The PETRA storage ring at DESY in Hamburg has been refurbished to become a highly brilliant synchrotron radiation source (now named PETRA III). Commissioning of the beamlines started in 2009, user operation in 2010. In comparison with our DORIS beamlines, the PETRA III experiments have larger complexity, higher data rates and require an integrated system for data storage and archiving, data processing and data distribution. Tango [1] and Sardana [2] are the main components of our online control system. Both systems are developed by international collaborations. Tango serves as the backbone to operate all beamline components, certain storage ring devices and equipment from our users. Sardana is an abstraction layer on top of Tango. It standardizes the hardware access, organizes experimental procedures, has a command line interface and provides us with widgets for graphical user interfaces. Other clients like Spectra, which was written for DORIS, interact with Tango or Sardana. Modern 2D detectors create large data volumes. At PETRA III all data are transferred to an online file server which is hosted by the DESY computer center. Near real time analysis and reconstruction steps are executed on a CPU farm. A portal for remote data access is in preparation. Data archiving is done by the dCache [3]. An offline file server has been installed for further analysis and inhouse data storage.

ICALEPCS 2011

9

* Examples (Conference Guide & Abstracts

Wednesday, 12 October, 2011

WEMMU004 SPI Boards Package, a New Set of Electronic Boards at Synchrotron SOLEIL – Y.-M. Ablven (SOLEIL), P. Bettinelli, J. Bisou, E. Blache, A. Chaitou, J. Coquet, N. Leclercq, P. Montelro, G. Renaud, J.P. Ricaud (SOLEIL)
SOLEIL is a third generation Synchrotron radiation source located in France near Paris. At the moment, the Storage Ring delivers photon beam to 23 beamlines. Since machine and beamlines improve their performance, new requirements are identified. On the machine side, new implementation for feedforward of electromagnetic undulators is required to improve beam stability. On the beamlines side, a solution is required to synchronize data acquisition with motor position during continuous scan. In order to provide a simple and modular solution for these applications requiring synchronization, the electronic group developed a set of electronic boards called "SPI board package". In this package, the boards can be connected together in daisy chain and communicate to the controller through a SPI* Bus. Communication with control system is done via Ethernet. At the moment the following boards are developed: a controller board based on a Cortex M3 MCU, 16bits ADC board, 16bits DAC board and a board allowing to process motor encoder signals based on a FPGA Spartan III. This platform allows us to embed process close to the hardware with open tools. Thanks to this solution we reach the best performances of synchronization.

Infrastructure management and diagnostics

WEMMU005 Fabric Management with Diskless Servers and Quattor in LHCb – L. Brarda (CERN), E. Bonaccorsi, G. Molne, P. Schweltzer (CERN)
Large scientific experiments nowadays very often are using large computer farms to process the events acquired from the detectors. In LHCb a small sysadmin team manages 1400 servers of the LHCb Event Filter Farm, but also a wide variety of control servers for the detector electronics and infrastructure computers: file servers, gateways, DNS, DHCP and others. This variety of servers could not be handled without a solid fabric management system. We choose the Quattor toolkit for this task. We will present our use of this toolkit, with an emphasis on how we handle our diskless nodes (Event filter farm nodes and computers embedded in the acquisition electronic cards). We will show our current tests to replace the standard (RedHat/Scientific Linux) way of handling diskless nodes to fusion filesystems and how it improves fabric management.

WEMMU006 Management Tools for Distributed Control System in KSTAR – S. Lee (NFRU), J.S. Park, M.K. Park, S.W. Yun (NFRU)
The integrated control system of the Korea Superconducting Tokamak Advanced Research (KSTAR) is a real-time distributed control system based on EPICS framework, and has the essential roles of remote operation and supervising of tokamak device, and conducting of plasma experiments without any interruption. Therefore the availability of the control system directly affects the entire device performance. For the non-interrupted operation of the control system, we developed a tool named as Control System Monitoring (CSM) to monitor the resources of EPICS IOC servers (utilization of memory, cpu, disk, network, user-defined process and system-defined process), the soundness of storage systems (storage utilization, storage status), the status of network switches using Simple Network Management Protocol (SNMP), the network connection status of every local control sever using Internet Control Management Protocol (ICMP), and the operation environment of the main control room and the computer room (temperature, humidity, electricity) in real time

92

Grenoble, France, 9–14 October, 2011

Wednesday, 12 October, 2011

and to raise alarms to operators. When abnormal conditions or faults are detected by the CSM, it alerts the operators. Among the faults, if the critical fault relating to data storage should happen the process failover module of the CSM is executed in the redundant server and minimizes the data loss. In addition to CSM, the channel archiver scheduler stops and runs the data storing process according to the user-defined policy.

Protection and safety systems

WEMMU007 Reliability in a White Rabbit Network – M.M. Lipinski (CERN), J. Serrano, T. Wlostowski (CERN) C. Prados (GSI)
White Rabbit (WR) is a time-deterministic, low-latency Ethernet-based network which enables transparent, sub-ns accuracy timing distribution. It is being developed to replace the General Machine Timing (GMT) system currently used at CERN and will become the foundation for the control system of the Facility for Antiproton and Ion Research (FAIR) at GSI. High reliability is an important issue in WR's design, since unavailability of the accelerator's control system will directly translate into expensive downtime of the machine. A typical WR network is required to lose not more than a single message per year. Due to WR's complexity, the translation of this real-world requirement into a reliability requirement constitutes an interesting issue on its own: a WR network is considered functional only if it provides all its services to all its clients at any time. This paper defines reliability in WR and describes how it was addressed by dividing it into sub-domains: deterministic packet delivery, data redundancy, topology redundancy and clock resilience. The studies show that the Mean Time Between Failure (MTBF) of the WR Network is the main factor affecting its reliability. Therefore, probability calculations for different topologies were performed using the "Fault Tree analysis" and analytic estimations. Results of the study show that the requirements of WR are demanding. Design changes might be needed and further in-depth studies required, e.g. Monte Carlo simulations. Therefore, a direction for further investigations is proposed.

WEMMU009 Status of the CERN's RBAC Infrastructure and Lessons Learnt from its Deployment in LHC – I. Yastrebov (CERN), P. Charrue, W. Sliwinski (CERN)
The distributed control system for the LHC accelerator poses many challenges due to its inherent heterogeneity and highly dynamic nature. One of the important aspects is to protect the machine against unauthorised access and unsafe operation of the control system, from the low-level front-end machines up to the high-level control applications running in the control room. In order to prevent an unauthorized access to the control system and accelerator equipment and to address the possible security issues, the Role Based Access Control (RBAC) project was designed and developed at CERN, with a major contribution from Fermilab laboratory. Furthermore, RBAC became an integral part of the CERN Controls Middleware (CMW) Infrastructure and it was deployed and commissioned in the LHC operation in the summer 2008, well before the first beam in LHC. This paper presents the current status of the RBAC Infrastructure, together with an outcome and gathered experience after a massive deployment in the LHC operation. Moreover, we outline how the project evolved over the last two years and give an overview of the major extensions introduced to improve integration, stability and its functionality. The paper also describes the plans of future project evolution and possible extensions, based on gathered users requirements and operational experience.

ICALEPCS 2011

93

*Examples (Conference Guide & Abstracts

14-Oct-11	14:45 – 15:30	Plenary Oral	Auditorium
FRDAU — Closing Session			
Chair: A. Gotz (ESRF)			
FRDAUI001 14:45	ICALEPCS 2011 highlights – <i>J.M. Chalze (ESRF)</i> wrap up of the ICALEPCS 2011. Main strams, keywords, highlights		
FRDAUI002 15:05	ICALEPCS 2013 – <i>C.D. Marshall (LLNL)</i> Presentation of the ICALEPCS 2013 organisation and venue		
FRDAUI003 15:15	ICALEPCS 2015 – <i>L. Corvetti (ASCo)</i> Abstract: The Australian Synchrotron (AS) wishes to contribute to the ICALEPCS series by hosting it in Melbourne, Australia in 2015. The AS will be supported by Australia's highly respected science and technology organisations, ANSTO, CSIRO and ANU with a desire to participate in the continuing success of ICALEPCS. The AS, a 3GeV third generation Synchrotron light source has been in operation since 2007 with expansion plans for new beamlines and further capability. Melbourne, a multicultural, safe and friendly city is an ideal location to host the ICALEPCS in 2015.		
FRDAUKP04 15:25	ICALEPCS 2011 Official Closing Ceremony – <i>A. Gotz (ESRF)</i> ICALEPCS2011 official closing ceremony		

Author List

Bold face papercodes indicate primary authors

— A —

Abadie, L.	MOPKS029
Abbott, D.	TUBAULT03
Abbott, M.G.	MOPKS027, MOPMU032 , THCHMUST03
Abelle, G.	MOPKN016 , WEPKS029
Abiven, Y.-M.	WEMMU004
Abram, A.	TUDAUST02, WEPMN034
Abu Ghannam, S.	MOCAT004
Ackermann, W.	MOPMN002
Adakin, A.S.	WEBHAUST06
Adams, P.	WEBHAUST04
Ageev, A.I.	WEPKN012
Aielli, G.	MOBAUST02, MOPMN014
Akal, K.	THDAULT05
Akiyama, A.	MOBAUST05
Akre, R.	WEPMS014
Al-dmour, E.	WEPMS024
Alegria, F.A.	MOPKS003
Aleman-Fernandez, R.	MOPMN027 , WEPMN007
Alesio, F.	MOBAUST06, WEPMU024
Alferov, V.	MOPMU004, WEPKN012
Allen, B.	MOMAU008
Allison, S.	WEPMN032
Al-Shabibi, A.	WEPMU036
Altunbas, Z.	MOBAUST04, MOPMU027 , WEPMU015
Alvarez, P.	TUBAULT04
Alves, D.	MOPMU035, WEPMN014 , THDAULT06, FRAAULT04
Ammendola, R.	WEPKS028
Amselem, A.	TUCAUST06, WEPMN028
An, S.	MOPMS007
Andersen, M.	MOPMS027
Andolfato, L.	WEAAULT03 , WEPKS032
Andreassen, O.O.	WEMAU003 , WEMAU007 , WEPMU010
Andreev, V.	MOPMS005
Andrianov, S.N.	WEPKN007
Andrighetto, A.	MOPKN012, MOPMS035, WEPMU017
Angoletta, M. E.	MOPKS024
Anicic, D.	TUDAUST03
Anitha, R.	MOPMU014
Antoine, A.	WEPMU019
Antonietti, F.	MOPMS016
Ao, X.	MOPKN022 , WEMAU006
Appelbee, C.W.	TUBAUST02
Aprin, L.	WEPMU004
Arabidze, G.	MOBAUST02, WEPMN023

*Examples (Abstract booklet IPAC2012)

FRYAP — Invited Oral Presentation (Synchrotron Light Sources and FELs)	353
FRYAP01 The Future of X-ray FELs	353
FRYBP — Invited Oral Presentation (Hadron Accelerators)	353
FRYBP01 Accelerators for Intensity Frontier Research	353
FRYCP — Closing Invited Oral Presentation	353
FRYCP01 Physics Results at the LHC and Implications for Future HEP Programmes	353
Author List	354

21-May-12	09:30 – 10:00	Invited Oral	Hall B (Plenary)
MOXAP — Invited Oral Presentation (Synchrotron Light Sources and FELs)			
Chair: V.P. Suller (LSU/CAMD)			
MOXAP01	09:30	The Scientific Revolution Enabled by X-ray Free Electron Lasers – J. Stohr (SLAC) This talk outlines how the advent of x-ray free electron lasers (X-FELs) has fundamentally changed x-ray science and is envisioned to enable the solution of important scientific problems that impact human life. While we are still exploring how to understand the interactions of the ultra-strong and ultra-short FEL x-ray pulses with matter and developing methods of improved control of the pulse properties, we are already using FEL x-rays for the solution of important problems in such areas as life science and health, the generation and storage of energy and the understanding of technological processes and their limits imposed by the laws of nature. This talk will review the present state of the dynamic and exciting development of X-FEL science and provide a glimpse of the future.	
21-May-12	10:00 – 10:30	Invited Oral	Hall B (Plenary)
MOXBP — Invited Oral Presentation (Circular and Linear Colliders)			
Chair: V.P. Suller (LSU/CAMD)			
MOXBP01	10:00	The First Two Years of LHC Operation – S. Myers (CERN) The operational performance of the LHC machine both for proton and lead ion operation are reviewed for the period 2010 and up to the present. The beam parameter path allowing the very high rate of collider performance is presented and discussed. The accelerator issues encountered and those somewhat surprisingly not encountered are also discussed. The short and longer term plans for the LHC are also briefly presented.	
21-May-12	11:00 – 11:30	Invited Oral	Hall B (Plenary)
MOYAP — Invited Oral Presentation (Applications of Accelerators)			
Chair: S. Henderson (Fermilab)			
MOYAP01	11:00	Accelerator Driven Systems – D. Vandeplassche (SCK-CEN) Accelerator Driven Systems are promising tools for the efficient transmutation of nuclear waste products in dedicated industrial installations (transmuters). The Myrrha project at Mol, Belgium, placed itself on the path towards these applications with a multipurpose and versatile system based on a liquid PbBi (LBE) cooled fast reactor (80 MWth) which may be operated in both critical and subcritical modes. In the latter case the core is fed by spallation neutrons obtained from a 600 MeV proton beam hitting the LBE coolant/target. The accelerator providing this beam is a CW superconducting linac which is laid out for the highest achievable reliability. The combination of a redundant and of a fault tolerant scheme should allow obtaining an MTBF value in excess of 500 hours that is required for optimal integrity and successful operation of the ADS. Myrrha is expected to be operational in 2023. The forthcoming 4-year period is fully dedicated to R&D activities, and in the field of the accelerator they are entirely focused on the reliability aspects.	
21-May-12	11:30 – 12:00	Invited Oral	Hall B (Plenary)
MOYBP — Invited Oral Presentation (Accelerator Technology)			
Chair: S. Henderson (Fermilab)			
MOYBP01	11:30	State-of-the-Art and Future Prospects in RF Superconductivity – K. Saito (KEK) This presentation should recount the remarkable progress in improving the performance of superconducting cavities over the past 50 years and explore future directions, including advances in materials other than Nb, such as MgB ₂ and novel multi-layer superconductor-insulator systems. This talk should provide an overview of international activities.	

* Examples (Abstract booklet IPAC2012)

MO0AC03 Superconducting Resonators Development for the FRIB and ReA Linacs at MSU: Recent Achievements and Future Goals	12
MO0BC — Contributed Oral Presentations (Accelerator Technology)	13
MO0BC01 Electron Linac Photo-fission Driver for the Rare Isotope Program at TRIUMF	13
MO0BC02 Status of Main Linac Cryomodule Development for Compact ERL Project	13
MO0BC03 A Multi-purpose X Band Accelerating Structure	13
MOEPPB — Poster Session	14
MOPPC — Poster Session	18
MOPPD — Poster Session	38
MOPPP — Poster Session	55
MOPPR — Poster Session	73
TUXA — Invited Oral Presentations (Hadron Accelerators)	92
TUXA01 Status of the J-PARC Facility	92
TUXA02 Upgrade Plans for the LHC Injector Complex	92
TUXA03 Increasing the AGS Beam Polarization with 80 Tune Jumps	92
TUYA — Invited Oral Presentations (Circular and Linear Accelerators)	92
TUYA01 Research and Development Toward a Future Muon Collider	92
TUYA02 Overview of Asymmetric Hadron Electron Colliders	92
TUYA03 Performance and Prospects of BEPCII	92
TUXB — Invited Oral Presentations (Synchrotron Light Sources and FELs)	93
TUXB01 Progress Towards Ultimate Storage Ring Light Sources	93
TUXB02 Review of ERL Projects at KEK and Around the World	93
TUXB03 Overview of Present and Future Compton Photon Sources	93
TUYB — Invited Oral Presentations (Particle Sources and Alt. Accel. Techniques)	93
TUYB01 Proton Beam Acceleration with Circular Polarized Laser Pulses	93
TUYB02 Manufacture and Testing of Optical-scale Accelerator Structures from Silicon and Silica	93
TUYB03 FFAG Experience and Future Prospects	93
TUOAA — Contributed Oral Presentations (Beam Dynamics and Electromagnetic Fields)	94
TUOAA01 3-Dimensional Modeling of Electron Clouds in Non-uniform Magnetic Fields	94
TUOAA02 Focusing Charged Particle Beams Using Multipole Magnets in a Beam Transport Line	94
TUOAA03 Tests of Low Emittance Tuning Techniques for SuperB at SLS and DAΦNE	94
TUOBA — Contributed Oral Presentations (Hadron Accelerators)	95
TUOBA01 Summary of Fermilab's Recycler Electron Cooler Operation and Studies	95
TUOBA02 Beam Commissioning and Operation of New Linac Injector for RIKEN RI-beam Factory	95

IPAC 2012 — New Orleans, LA, USA, May 21–25, 2012 2

TUOBA03 H ⁺ and Proton Beam Loss Comparison at SNS Superconducting Linac	95
TUOAB — Contributed Oral Presentations (Instrumentation)	96
TUOAB01 Timing and Synchronization for the APS Short Pulse X-ray Project	96
TUOAB02 Investigation of the Use of Silicon, Diamond and Liquid Helium Detectors for Beam Loss Measurements at 2 Kelvin	96
TUOAB03 Five Years of Operation Experience at HIT	96
TUOBB — Contributed Oral Presentations (Light Sources and FELs)	97
TUOBB01 A European Proposal for the Compton Gamma-ray Source of ELI-NP	97
TUOBB02 Commissioning of the PLS-II	97
TUOBB03 Status of the FERMI@Elettra Project	97
TUOAC — Contributed Oral Presentations (Accelerator Technology)	98
TUOAC01 Challenges of the FAIR Vacuum System	98
TUOAC02 Development of HTS Magnets	98
TUOAC03 Development and Test of a Single-Aperture 11T Nb3Sn Demonstrator Dipole for LHC Upgrades	98
TUOBC — Contributed Oral Presentations (Circular and Linear Colliders)	99
TUOBC01 Experimental Verification of the CLIC Two-beam Scheme, Status and Outlook	99
TUOBC02 Small-Beta Collimation at SuperKEKB to Stop Beam-Gas Scattered Particles and to Avoid Transverse Mode Coupling Instability	99
TUOBC03 Experimental Measurements of e-Cloud Mitigation using Clearing Electrodes in the DAΦNE Collider	99
TUEPPB — Poster Session	100
TUPPC — Poster Session	104
TUPPD — Poster Session	123
TUPPP — Poster Session	141
TUPPR — Poster Session	158
WEXA — Invited Oral Presentations (Hadron Accelerators)	176
WEXA01 Project X: The High Intensity Horizon at Fermilab	176
WEXA02 Development of Electron Coolers in Novosibirsk	176
WEXA03 Accelerator Physics and Technology for FRIB	176
WEYA — Invited Oral Presentations (Circular and Linear Accelerators)	177
WEYA01 CLIC R&D Status and Implementation Studies	177
WEYA02 Studies at CsrTA of Electron Cloud Beam Dynamics for Future Damping Rings	177
WEYA03 Overview of B Factories	177
WEXB — Invited Oral Presentations (Instrumentation, Controls, Feedback)	178
WEXB01 Recent Advances and New Techniques in Visualization of Ultra-short Relativistic Electron Bunches	178

IPAC 2012 — New Orleans, LA, USA, May 21–25, 2012 3

* Examples (Conference Guide IPAC2012)

MOPPC077 Simulation and Analysis of the Beam Signal in Taiwan Photon Source Booster - C.C. Chiang (NSRRC), H.-P. Chang, P.J. Chou (NSRRC)

02 Synchrotron Light Sources and FELs

MOPPC078 Simulation Studies of Injection Scheme in TPS Storage Ring - Y.C. Lee (NSRRC), H.-P. Chang, P.J. Chou (NSRRC)

05 Beam Dynamics and Electromagnetic Fields

MOPPC079 Space-Charge Calculations in the EMMA ns-FFAG Ring Using GPT - R.T.P. D'Arcy (UCL), B.D. Muratori (STFC/DL/ASTeC), S.B. van der Geer (Pulsar Physics)

MOPPC080 Modeling Space Charge in an FFAG with Zgoubi - S.C. Tygier (UMAN), R. Appleby, H.L. Owen (UMAN), R.J. Barlow (University of Huddersfield)

MOPPC081 Simulation of RF Dark Current in the Presence of a Helical Magnetic Field - G.V. Romanov (Fermilab), V.S. Kashikhin (Fermilab)

MOPPC082 Beam Dynamics Simulations in RFQ with CST Studio Suite - G.V. Romanov (Fermilab)

MOPPC083 Graphical User Interface for Accelerator Modeling - T.J. Roberts (Muons, Inc), P. Guéye (Hampton University)

MOPPC084 G4beamline Code Development - T.J. Roberts (Muons, Inc)

MOPPC085 An Integrated Green Function Poisson Solver for Rectangular Waveguides - R.D. Ryne (LBNL)

MOPPC086 Accelerator Simulation - Beyond High Performance Computing - S. James (LBNL), B.C. Li, K. Muriki, H. Nishimura, Y. Qin, K. Song, C. Sun (LBNL)

MOPPC087 The Invariant Spin Field in the Relativistic Heavy Ion Collider - D.T. Abell (Tech-X), D. Meiser (Tech-X), V.H. Ranjbar (BNL)

MOPPC088 GPU Accelerated Spin Tracking - D. Meiser (Tech-X), D.T. Abell (Tech-X), D.P. Barber (DESY), V.H. Ranjbar (BNL)

MOPPC089 CUDA Kernel Design for GPU-based Beam Dynamics Simulations - I.V. Pogorelov (Tech-X), K.M. Amyx, J. James (Tech-X), M. Borland, R. Soltz, Y. Wang (ANL)

04 Hadron Accelerators

MOPPC090 Coupling Modulator Simulations into an FEL Amplifier for Coherent Electron Cooling - I.V. Pogorelov (Tech-X), G.I. Bell, D.L. Bruhwiler, B.T. Schwartz (Tech-X), Y. Hao, V. Litvinenko, G. Wang (BNL)

05 Beam Dynamics and Electromagnetic Fields

MOPPC091 Parallel 3D Simulations to Support Commissioning of a Solenoid-based LEBT Test Stand - B.T. Schwartz (Tech-X), D.L. Bruhwiler, Y. Choi, S. Mahalingam, P. Stoltz (Tech-X), B. Han, M.P. Stockli (ORNL)

46 New Orleans, LA, USA, May 21-25, 2012

04 Hadron Accelerators

MOPPC092 Effects of 3D Dynamics in the Kicker Section of a Coherent Electron Cooling System - B.T. Schwartz (Tech-X), G.I. Bell, D.L. Bruhwiler, I.V. Pogorelov (Tech-X), Y. Hao, V. Litvinenko, G. Wang (BNL), S. Reiche (Paul Scherrer Institut)

05 Beam Dynamics and Electromagnetic Fields

MOPPC093 Optimal Fast Multipole Method Data Structures - S. Abeysratne (Northern Illinois University), B. Erdelyi (Northern Illinois University), S.L. Manikonda (ANL)

MOPPC094 Charge Density Estimation with Orthogonal Polynomials - D. Hernandez (Northern Illinois University)

MOPPC095 XAI's Online Model at ReA3 to Understand Beam Performance - C. Benatti (NSCL), P. Chu, M.J. Syphers (FRIB)

MOPPC096 Multiphysics Applications of ACE3P - K.H. Lee (SLAC), A.E. Candel, K. Ka, Z. Li, C.-K. Ng (SLAC)

MOPPC097 ACE3P - Parallel Electromagnetic Code Suite for Accelerator Modeling and Simulation - C.-K. Ng (SLAC), A.E. Candel, L. Ge, K. Ka, K.H. Lee, Z. Li, S. Oakley, G.L. Schussman, L. Xiao (SLAC), R. Ainsworth (Royal Holloway, University of London), R. Rodriguez (Muons, Inc)

21-May-12 16:00 - 18:00 Poster Decatur St
MOPPD - Poster Session

04 Hadron Accelerators

MOPPD001 Accelerator R&D in the QUASAR Group - C.P. Welsch (Cockcroft Institute), C.P. Welsch

MOPPD002 The Ultra-low Energy Storage Ring - C.P. Welsch (Cockcroft Institute), D. Newton, M.R.F. Siggel-King (Cockcroft Institute), O.E. Gorda, O. Karamyshev, M. Pannicello, A.I. Papash (MPI-K), J. Hrusimowicz, M. Putignano, C.P. Welsch

06 Instrumentation, Controls, Feedback and Oper. Aspects

MOPPD003 DITANET - An International Network in Beam Diagnostics - C.P. Welsch (Cockcroft Institute), C.P. Welsch

05 Beam Dynamics and Electromagnetic Fields

MOPPD004 oPAC - Optimizing Accelerators through International Collaboration - C.P. Welsch (Cockcroft Institute), C.P. Welsch

04 Hadron Accelerators

MOPPD005 Stochastic Cooling of Antiprotons in the Collector Ring at FAIR - C. Dimopoulos (GSI), A. Dolinskii, F. Nolden, C. Peschke, M. Steck (GSI), D. Möhl (CERN)

MOPPD006 Commissioning of the 2MeV Electron Cooler for COSY / HESR - V. Kamerdzhiev (FZJ), J. Dietrich (FZJ), M.I. Bryzgunov, A.D. Goncharov, V.M. Panasyuk, V.V. Parkhomchuk, V.B. Reva, D.N. Skorobogatov (BINP SB RAS)

IPAC 2012

47

P May 21



Examples (Pre-session abstract listing HB2012)

- 1101 **Numerical Calculation of Beam Coupling Impedances in the Frequency Domain for the SIS100 synchrotron for FAIR** – U. Niedermayer (TEME TU Darmstadt), O. Boine-Frankenheim (TEME TU Darmstadt)
The transverse impedance of kicker magnets is considered to be one of the main beam instability sources in the projected SIS-100 at FAIR and also in the SPS at CERN. The longitudinal impedance can contribute to the heat load, which is especially a concern in the cold sections of SIS-100 and LHC. In the high frequency range, time domain codes are commercially available to calculate the impedance but they become inapplicable at medium and low frequencies. We present the ongoing work of developing a Finite Integration (FIT) solver in frequency domain which is based on the Parallel and Extensible Toolkit for Scientific computing (PETSc) framework in C++. The code is applied to an inductive insert used to compensate the longitudinal space charge impedance in low energy machines. Another application focuses on the impedance contribution of a ferrite kicker with inductively coupled pulse forming network (PFN) and frequency dependent complex material permeability. In future we plan to confirm our simulations with dedicated wire or coil bench measurements.
- 1102 **Thermal effects in the transport of initially inhomogeneous beams** – R. Pakter (IF-UFRGS), A. Endler, E.B. Rizzato, E.G. Souza (IF-UFRGS)
We investigate the role of the temperature in the onset of singularities and the consequent breakdown of the fluid description in the transport of continuous, intense, inhomogeneous charged particle beams. In the cold beam limit, this system is shown to present wave breaking which is responsible for particle ejection from the beam core and formation of halo. Here, we develop a Lagrangian fluid model for the beam evolution that incorporates thermal effects using an adiabatic approximation. It is found that below a certain temperature threshold a different type of singularity that is responsible for the breakdown of the fluid description is present. Namely, a singular growth of the pressure gradient. As the threshold temperature is approached, however, the time for the occurrence of the singularity diverges and is found to be absent above it. In other words, the fluid model predicts the existence of a critical temperature that separates two different dynamical phases: a nonadiabatic transport at lower temperatures and a completely adiabatic evolution at higher temperatures. These findings are verified with the aid of self-consistent N-particle simulations.
- 1103 **Experimental Study of Beam Halo Formation due to Mismatch of the Intense Beam** – H.D. Zhang (UMD), R.A. Kishek (UMD)
Beam halo is a common phenomenon in particle beams, especially for modern, advanced accelerators where high beam intensities lead to strong space charge. It is generally understood as a population of particles which do or will reach large transverse radii relative to a more intense, centralized beam core. It is associated with emittance growth, the beam quality degrading and the beam loss. In illustrating halo formation, the most successful models are the particle-core model [1] and free energy model [2] which describe a parametric resonance due to envelope mismatch as the dominant cause for halo formation in the space charge regime. But few experiments have been carried out to test these theories and further modify them. In this paper, we present the design of an experiment to study halo formation from envelope mismatch for beams spanning a wide range of intensities in the University of Maryland Electron Ring (UMER) [3]. A new diagnostic for high-dynamic range halo measurements is also introduced [4]. Comparison of several beam parameters during halo formation process between theory and experiment will be discussed.
- 1121 **High energy electron cooling** – V.B. Reva (BINP SB RAS), M.I. Brygunov, V.M. Panasyuk, V.V. Parkhomchuk (BINP SB RAS)
The electron cooler of a 2 MeV for COSY storage ring FZJ is assembled in BINP. This paper describes the first experimental results from the electron cooler with electron beam and high voltage. The cooling section is designed on the classic scheme of low energy coolers like cooler CSRm, CSRe, LEIR that was produced in BINP before. The electron beam is transported inside the longitudinal magnetic field along whole trajectory from an electron gun to a collector. This optic scheme is stimulated by the wide range of the working energies 0.1(0.025)-2 MeV. The electrostatic accelerator consists of 34 individual unity section. Each section contains two HV power supply (plus/minus 30 kV) and power supply of the magnetic coils. The electrical power to each section is provided by the cascade transformer. The cascade transformer is the set of the transformer connected in series with isolating winding.
- 1142 **Medium Energy Beam transport Design Update For ESS** – I. Bustinduy (ESS Billroth) B. Cheymol, M. Edraqui (ESS), J. Stovall (CERN)
The major challenge of this part of the accelerator is to keep a high quality beam, with a pulse well defined in time, a low emittance and a minimized halo, so that the beam losses downstream the linac be limited and the overall ESS reliability be maximized. In order to minimize beam loss at high energy linac, and the consequent activation of components, a fast chopping scheme is presented for the medium energy beam transport section (MEBT). The considered versatile MEBT is being designed to achieve four main goals: First, to contain a fast chopper and its correspondent beam dump, that could serve in the commissioning as well as in the ramp up phases. Second, to serve as a halo scraping section by means of two adjustable blades. Third, to measure the beam phase and profile between the RFQ and the DTL, along with other beam monitors. And finally, to match the RFQ output beam characteristics to the DTL input both transversally and longitudinally. For this purpose a set of ten quadrupoles is used to match the beam characteristics transversally, combined with two 352.2 MHz buncher cavities, which are used to adjust the beam in order to fulfill the required longitudinal parameters.
- 1143 **Space charge suppression for flat beams** – A.V. Burov (Fermilab) Y.S. Derbenev (JLAB)
Benefits and problems for operation with flat beams are discussed.

- 1144 **Test of ferrite rings for CSNS/RCS RF cavities** – H. Shi (IHEP), X. Li, W. Long, H. Sun, J.Y. Tang (IHEP)
The measurement of ferrite rings provides very important information for designing the RF cavities and the whole RF system of CSNS/RCS. A new two-ring ferrite test system for the CSNS/RCS ferrite-loaded cavities has been developed. The test system includes the test bench, 3 kW valve power amplifier, 3000 A bias current source and LLRF control system. The characteristics of the ferrite rings in low and high RF field with dc and ac bias current were tested respectively with this system. The dependence of RF frequency on bias current is given. With the increasing of the repetition rate of ac bias current, the obvious dynamic loss was observed, and the additional bias current is required to achieve resonance.
- 1145 **Beam halo dynamics and control with hollow electron beams** – G. Stancari (Fermilab)
Experimental measurements of beam halo population and diffusion dynamics with collimator scans are reviewed. The concept of halo control with a hollow electron beam collimator, its demonstration at the Tevatron, and its possible applications at the LHC are discussed.
- 1161 **Physics design of the C-ADS main linac with two different injector schemes** – F. Yan (IHEP), Z. Li, C. Meng, J.Y. Tang (IHEP)
Two design schemes for the main linac of C-ADS (China Accelerator Driven Subcritical system) are presented in this paper. They are corresponding to two different injector schemes. Injector-II scheme makes use of room-temperature RFQ and superconducting HWR cavities with the RF frequency of 162.5 MHz; Injector-I scheme makes use of higher-energy RFQ and superconducting spoke cavities with the RF frequency of 325 MHz. At the first choice, a relatively smaller longitudinal emittance is adopted for the RFQ designs with both the injector schemes to obtain more efficient acceleration. However, compared with the injector-I scheme, with the injector-II scheme, bunch current will be doubled in the main linac due to the half RF frequency in the injector-II. This means stronger space charge effects. Alternate design for the main linac with the injector-II scheme is to increase the longitudinal emittance by 50% so that the space charge effects will be alleviated. However, totally 30 cavities more and 36 m longer in the main linac have to be paid for this design scheme. The design considerations, the lattice designs, the simulation results including halo information are presented.
- 1162 **Fiber Based BLM System R&D at CERN** – E.B. Holzer (CERN), J.W. van Hooser (CERN) S. Malloves (The University of Liverpool)
The application of a beam loss measurement (BLM) system based on Cherenkov light generated in optical fibers to a linear accelerator with long bunch trains is currently under investigation at CERN. In the context of the Compact Linear Collider (CLIC) study, the machine protection role of the BLM system consists of its input to the 'next cycle permit'. In between two cycles it is determined whether it is safe to commit the machine for the next cycle. A model for light production and propagation has been developed and validated with beam measurements. Monte Carlo simulations of loss scenarios established the suitability in terms of sensitivity and dynamic range. Test set-ups of a Cherenkov fiber BLM system were installed at the CLIC Test Facility, CTF3. Model predictions and measurements will be presented: of the achievable longitudinal position resolution of the system, considering that the bunch trains and the optical fiber length are comparable in size; and of the possibility to distinguish between losses from the drive beam decelerator and the main linac, which run in parallel.
- 1164 **A method to measure the incoherent synchrotron frequencies in bunches** – O. Chorniy (GSI), H. Rogg (GSI)
The method of measuring the incoherent synchrotron frequencies in a stationary bunch is presented. It can be shown that by measuring the local current at a fixed coordinate in RF bucket the corresponding incoherent synchrotron frequency can be obtained. Test calculations were done using simulation data where beam loading and space charge were included. The incoherent frequencies obtained with method are in a good agreement with theory. In real experiment, the incoherent frequencies were determined from bunch profiles recorded in the SIS18 with low intensity beam at injection energy. Bunch profiles were measured with a new Fast Current Transformer which has a relatively broad frequency range. The profiles were recorded using 8 bit resolution oscilloscope. The frequency spectra of local current fluctuation at different longitudinal positions were obtained numerically. The strongest lines in these spectra were at positions of theoretically expected incoherent frequencies. In this paper the method is described in details, the comparison of incoherent frequencies obtained from the simulation and measurement data with theoretical solutions is shown.
- 1166 **Resistive-wall instability in the CSNS/RCS** – L. Huang (IHEP), Y.D. Liu, S. Wang (IHEP)
Rapid Cycling Synchrotron (RCS) of the China Spallation Neutron Source (CSNS) is a high intensity proton accelerator, with average beam power of 100kW. The collective effects caused by the coupling impedance may be the limit to beam power. The impedance estimation for components on beam line shows that the resistive wall impedance and its instability are more serious than any others. Based on the impedance budget, the instability is theoretically estimated. A simple resistive wall wake field model is used to simulate the bunch oscillation and obtain the growth rate. In this simulation model, the continuous resistive wall wake field is concentrated to one position in the ring and the long bunch is sliced into many micro-bunches. By tracking the dynamics of the macro-bunches, the transverse growth rates are obtained in 100kW and 200kW beam power, respectively. The simulation results are also confirmed the restriction to instability by natural chromaticity.
- 1167 **Error Analysis and Correction Scheme in C-ADS Injector-I** – C. Meng (IHEP), Z. Li, C. Meng, J.Y. Tang (IHEP)
C-ADS Injector-I is a 10mA 10MeV CW proton linac. It uses a 3.2MeV normal conducting 4-Vane RFQ and 12 superconducting single-Spoke cavities. According to the detailed sensitivity analysis of alignment and RF errors, the error tolerance of both static and dynamic ones for Injector-I are presented. The simulation results show that

*Examples (Pre-session author listing HB2012)

Author List

Boldface papercodes indicate primary authors

— A —

Aberle, O. 1206, 1212
 Adams, D.J. 1218, 1221, **1226**
 Alemany-Fernandez, R. 1211
 An, Y.W. **1227**
 Andre, C.A. 1170, 1222
 Antoniou, F. **1305**
 Arduini, G. 1212, 1243, 1251, 1274, 1297, 1304
 Argyropoulos, T. 1197, 1233, 1243, 1251, 1255
 Assmann, R.W. 1206, 1212, 1230
 Aumon, S. 1243

— B —

Baartman, R.A. 1300
 Baer, T. 1182, 1298
 Baglin, V. 1212
 Barnes, M.J. 1212
 Bart Pedersen, S. 1298
 Bartosik, H. 1243, **1251**, **1274**
 Baudrenghien, P. 1212, 1241, **1263**
 Beaudoin, B.L. 1041
 Becker, F. **1170**, **1222**
 Bellodi, G. 1217
 Benedetto, E. 1243, 1274
 Benedikt, M. 1259
 Bertarelli, A. 1206, 1212, **1269**
 Berz, M. 1275
 Biancacci, N. 1243, **1297**
 Biarrotte, J.-L. 1209
 Blanco, J. **1276**
 Blokland, W. **1236**
 Boccad, C.B. 1206
 Böhme, C. 1201
 Bohl, T. 1197, 1233, 1243, 1251, 1255
 Boine-Frankenheim, O. 1232, **1288**, **1101**, **1214**
 Bollinger, D.S. 1266
 Boorman, G.E. 1260
 Borburgh, J. 1243
 Bosco, A. 1260
 Bracco, C. 1212
 Brooks, S.J. **1207**
 Brown, B.C. **1294**
 Bruce, R. 1206, 1212, 1230
 Bryzgunov, M.I. 1121
 Buffat, X. 1211, 1268
 Burkart, F. 1206, 1276
 Burov, A.V. **1143**
 Bustinduy, I. **1142**

— C —

Calaga, R. 1211
 Caliri, C. 1296
 Calvo, E. 1206
 Carli, C. 1243, 1274
 Carra, E. 1212, 1269
 Caspers, F. 1212, 1243
 Castro, G. 1296
 Cattenoz, G. 1212
 Cauchi, M. 1206
 Celona, L. 1296
 Cha, S. 1238
 Charitonidis, N. 1276
 Chauvin, N. 1267, 1302, **1299**
 Chen, J.F. **1188**

Author List

Cheng, P. 1187, **1198**
 Cheymol, B. 1142, **1201**, **1202**
 Cha, Y.-S. 1238
 Chorniy, O. **1164**, **1189**, **1214**
 Ciavola, G. 1296
 Claudet, S.D. 1212
 Comunian, M. **1323**
 Cornelis, K. 1211, 1251, 1306
 Cousineau, S.M. 1184

— D —

Dalocchio, A. 1206, 1269
 Damerau, H. 1197, 1243
 Danared, H. 1224
 Dandl, T. 1170
 Day, F.V. 1182
 Day, H.A. 1212
 Deboy, D. 1206
 Dehning, B. 1182, 1262, 1298
 Delferrière, O. 1299
 Derbenev, Y.S. 1143
 Di Giugno, R. 1296
 Dölling, R. **1042**
 Dorn, C. 1170
 Drosdal, L.N. **1306**
 Ducl, K.L. 1266
 Duperré, B.-A. **1228**
 Duperrier, R.D. 1299
 Durickovic, B. 1244

— E —

Eddy, N. 1266
 Effinger, E. 1298
 Efthymiopoulos, I. 1259, 1276
 Eliseev, A.V. 1223
 Endler, A. 1102
 Eshraqi, M. 1142, **1205**, **1224**
 Esteban Muller, J. 1197, 1233, 1251, **1255**, **1212**, 1243

— F —

Facco, A. 1247
 Fang, S.X. 1301
 Feldman, D.W. 1041
 Fischer, W. 1021
 Fitterer, M. 1211, 1274
 Forck, P. 1170, 1109, 1222
 Forte, V. 1243, 1274
 Franchetti, G. 1234, 1243, **1285**
 Francon, P. 1269
 Fu, S. 1181, 1199, 1271, 1295, **1301**

— G —

Gabor, C. **1260**
 Gammimo, S. 1296
 Garlasche, M. 1212
 Garoby, R. 1243
 Gassior, M. 1206
 Geng, H. 1187, 1208
 Gentini, L. 1212, 1269
 Gerigk, F. 1259
 Giachino, R. 1211, 1268
 Gillardoni, S.S. **1243**, **1274**
 Giovannozzi, M. 1243
 Gobin, B. 1299
 Goddard, B. 1212, 1243, 1306

*Conclusion

With SPMS and the export and pre-formatting scripts
you can do nearly everything

- * if you know what you want
- * if you plan early
- * if you have a cost planning
- * if you look for a printing house when you know what you want to print
- * ...