



PREFACE

The 31st International Linear Accelerator Conference, the first in-person Linac conference since Beijing in 2018 was hosted by STFC, the Cockcroft Institute and the John Adams Institute at the Arena and Convention Centre (ACC) in Liverpool, between 28 August and 2 September 2022. In fact, this was the first time that a Linac conference has ever been held in the UK in its 60+ year history.

The conference was chaired by Peter McIntosh (STFC Daresbury Laboratory), with Graeme Burt (Lancaster University) as Scientific Programme Committee (SPC) Chair and Carsten P Welsch (University of Liverpool) as the Local Organising Committee (LOC) Chair.

The event welcomed almost 350 accelerator specialist delegates from all over the world, who were updated on the impactful developments for linear accelerators which have occurred since the 'Virtual' LINAC'20 conference.

As an inherent ability to help deal with remnant problems experienced globally from the CV-19 pandemic, the conference also provided remote participation via the LINAC'22 mobile app for all registered delegates, being a first ever inclusion for the LINAC conference series. This was smoothly integrated into the event by Daresbury Laboratory's experienced Media Services team.

Conference Focus

An implicit focus for LINAC'22 has been to include a variety of ED&I processes in order to try and breakdown any subconscious barriers for inclusion, ranging from the branding used, the provision of free childcare for delegates and using inclusive language in all communication. The conference delegate and speaker gender balance both reached a significantly improved level of 20% for female participants. 70% of travel grants were also awarded to PhD students who identify as female.

As well as the introductory talk from Alan Letchford (STFC) 'The ISIS Linac Upgrade/FETs' and the closing talk by Jonathan Farr (AVO) 'The Future of Medical Linacs', several highlight topics were presented at this year's conference, including:

- Commissioning results from FRIB, LCLS-II, SPIRAL-2, RAON, IFMIF, LEAF and SARAF
- Development updates from EIC, PIP-II, ESS, FACET-II, AWAKE, ILC, CSNS-II, ISAC and SwissFEL

The LINAC conference has a long history of excellent technical talks over a wide variety of linac technologies, and LINAC'22 has continued this tradition. The scientific programme committee had to change the way it operated in order to create such a strong programme without face-to-face meetings and I thank everyone involved for doing such an amazing job.

Student Poster Session

With a student poster adjudication process conducted by the SPC on the Sunday afternoon, three students were judged to be awarded prizes, sponsored by the IOP and IET. These were announced by the SPC Chair on the Thursday. The prize winners were:



Student Poster Session

With a student poster adjudication process conducted by the SPC on the Sunday afternoon, three students were judged to be awarded prizes, sponsored by the IOP and IET. These were announced by the SPC Chair on the Thursday. The prize winners were:

- 1st Sonja Jaster-Merz (DESY)**
First Studies of 5D Phase-Space Tomography of Electron Beams at ARES
- 2nd Yuga Nakazawa (Ibaraki University)**
High Power Test of an APF IH-DTL Prototype for the Muon Linac
- 3rd Catarina Filipa Da Palma Serafim (CERN)**
Microscopy Investigation on Different Materials After Pulsed High Field Conditioning and Low Energy H- Irradiation

A Warm, Liverpool Welcome

On the Monday evening, the conference Chairs invited the IOC, SPC, speakers and Joint Accelerator Conferences Website (JACoW) proceedings editorial team, to a welcome reception at the Liverpool Anglican Cathedral. The welcome was accompanied by an introduction to the cathedral from Canon Scientist Rev Dr Mike Kirby, who also lectures in Radiotherapy Physics at Liverpool University. The event culminated in a demonstration of the awesome acoustic power of the cathedral's 10,268 pipe organ; the largest in the UK.

On the Tuesday evening, a Women in Science and Engineering (WISE) session was conducted which comprised the eminent Prof. Averil Macdonald OBE, who gave the keynote address for the topic of Reclaiming the Authority Gap. In addition, an illustrious panel discussed with the audience possible solutions to dealing with this problem in scientific and educational organisations. Anna Shabalina (STFC Daresbury Laboratory) and Steve Jamison (Lancaster University), together with Tessa Charles (University of Liverpool) who was also in charge of the overall EDI aspects of the conference, deserve significant credit for the coordination and delivery of this impactful session which received extensive acknowledgement from the LINAC'22 participants. It is hoped that the recent addition of a WISE session to both the Virtual LINAC'20 and this LINAC'22 can be maintained for future conferences.

Networking On and Off-site

The LINAC'22 conference provided delegates with the opportunity to engage and network with the 20 exhibitors who were available to showcase their capabilities and the 250+ posters presented over the five days of the conference, facilitated by the excellent Liverpool ACC conferencing venue.

On the Wednesday afternoon, as tradition dictates, the LINAC'22 delegates were provided an opportunity to network and engage via a series of excursions. These included a Beatles experience, a guided tour of Chester, a visit to the industrial revolution site of Quarry Bank Mill and a hike up Moel Famau in the Clywdian Range.

LINAC'22 Farewell

The closing of the LINAC'22 conference took place at the ACC on Friday, with each of the three conference Chairs providing a recognition and thank you for all contributing teams, exhibitors and sponsors. The conference was then formally closed by the Conference Chair Peter McIntosh, officially handing over the legacy Linac 'Gavel and Block' to the incoming conference chair John Byrd (Argonne National Laboratory), for the next LINAC conference which is to be held in Chicago in 2024. During the final afternoon, many delegates had the opportunity to visit Daresbury Laboratory. Projects they got to view included CLARA, ESS high beta cavities, HL-LHC crab cavity cryomodules, PIP-II cryomodules, LBNF/DUNE APA detectors, Engineering Technology Centre and a suite of accelerator preparation laboratories.



I am incredibly proud for the UK to have re-launched the International Linac Conference series with LINAC'22 in Liverpool, after such a long period of absence for the global accelerator community. For the STFC Daresbury Laboratory, Cockcroft Institute and John Adams Institute teams, this conference delivery has been an amazing achievement, very well done to everyone involved!

With Thanks

The organisers would like to acknowledge and thank all the delegates who attended, the exhibitors who participated and sponsored the conferences, along with all of the coordination and management teams who ensured that LINAC'22 could be so effectively prepared and delivered. We are delighted that we have been able to successfully 'restart' the international conference series here in Liverpool.

Great thanks go to the exhibitors and sponsors who have provided an excellent ability to engage with its participants.

The scientific programme presentations were provided by delegates, some of whom had to give their talks remotely. Media Services team from STFC Daresbury Laboratory did an excellent job in frequently adapting the programme, facilitating updates to the LINAC'22 app, supporting a multitude of requests throughout the week and providing access to the recorded presentations via the LINAC'22 app post-conference.

The JACoW editing team, led by Rob Apsimon (Lancaster University) worked tirelessly throughout both the preceding week and during the conference the itself, to process the submitted papers, posters and presentations to prepare a limited pre-print of the proceedings and ultimately these published proceedings.

Many thanks to all contributors and delegates for LINAC'22 and we look forward to meeting with you all again in Chicago in 2024!

Peter McIntosh	Conference Chair
Graeme Burt	SPC Chair
Carsten Welsch	LOC Chair

