A New Mode for Operation with Insertion Devices at UVX (LNLS-1)

Liu Lin

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Campinas – São Paulo – Brazil

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Outline

1. Brief introduction to LNLS
2. The operation modes for UVX: Standard, BBY6T
3. Effects of IDs
4. Commissioning of BBY6T
5. Characterization of BBY6T
6. Conclusions

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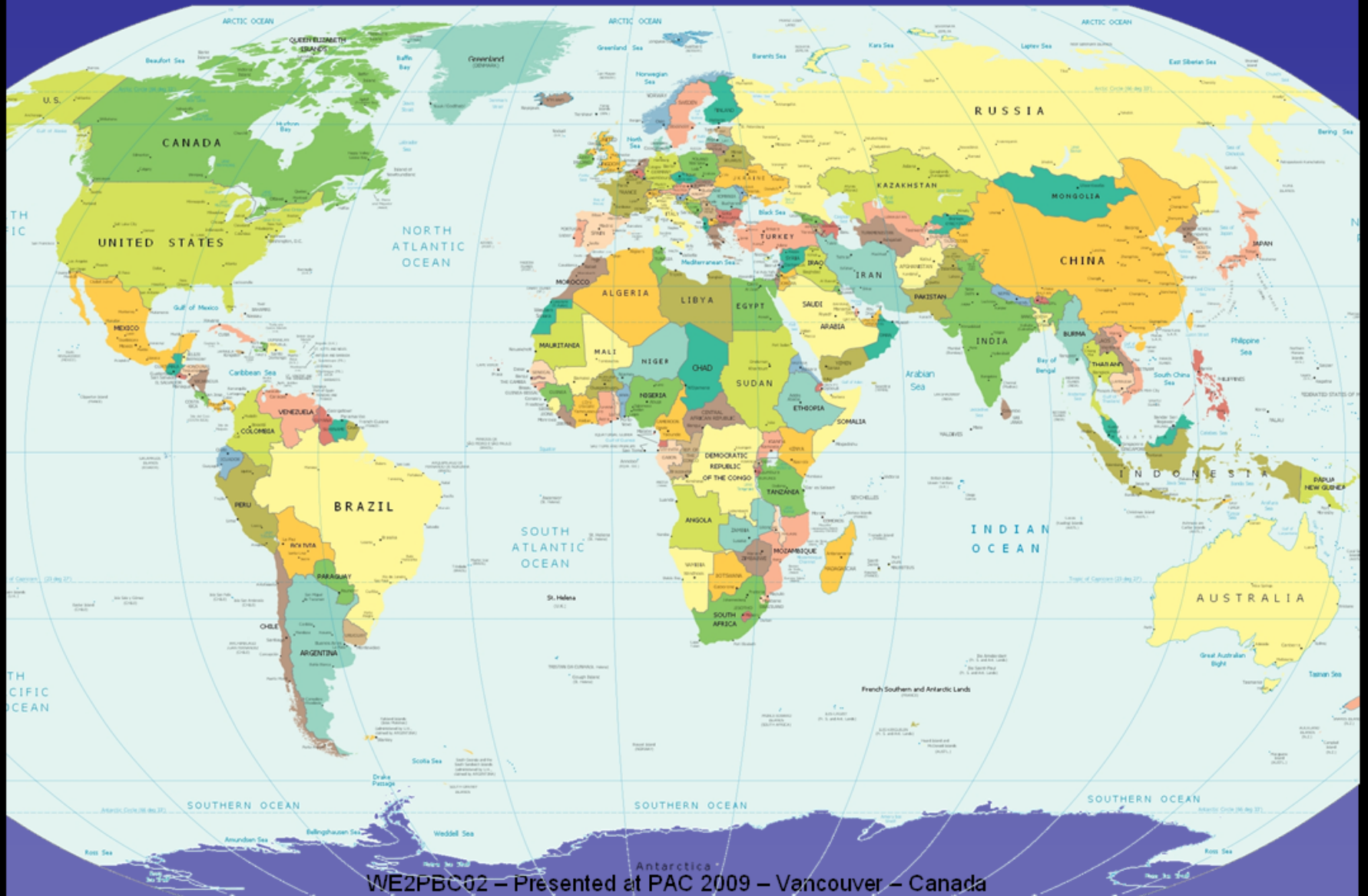
Where LNLS is located ...



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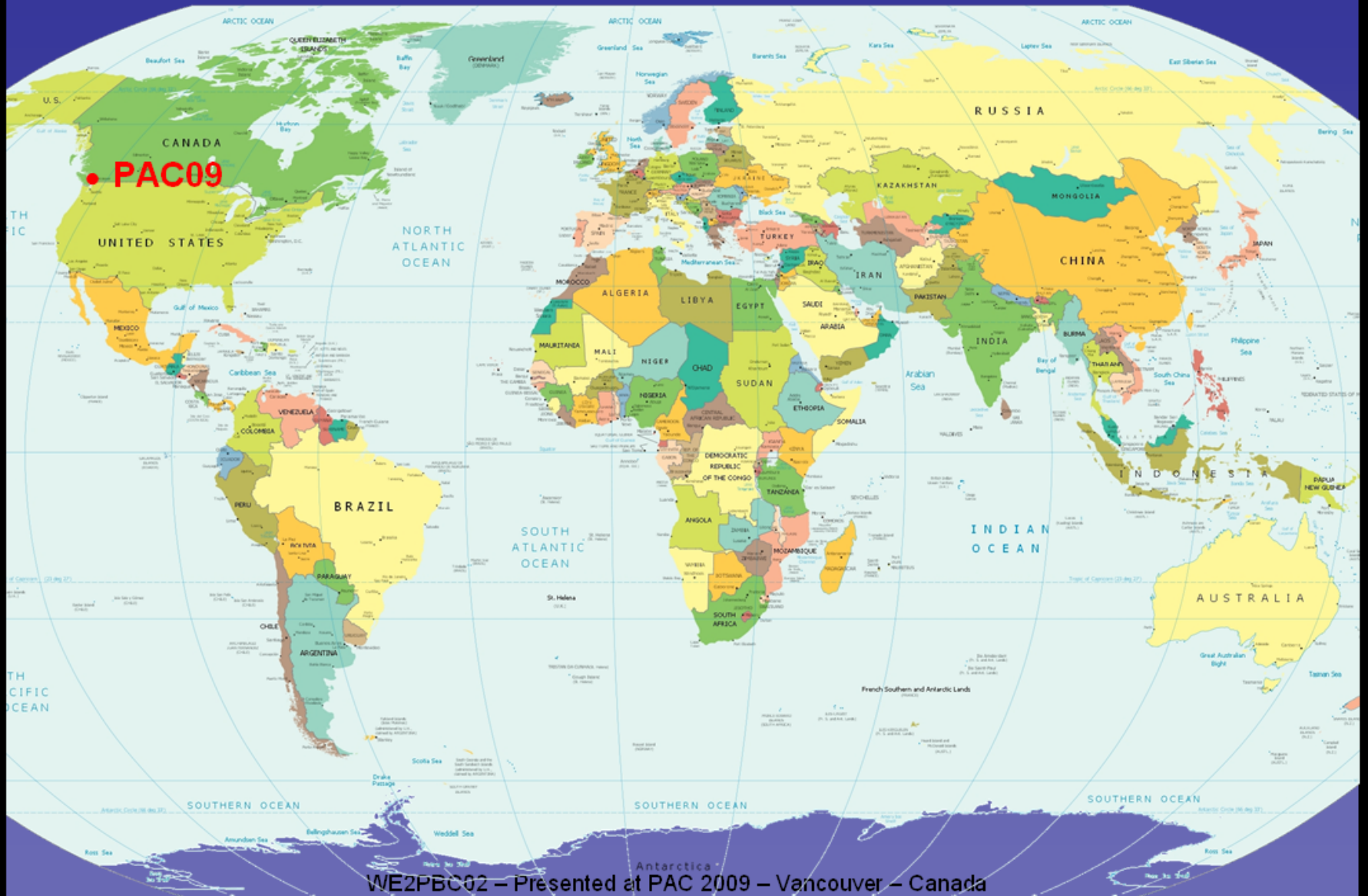

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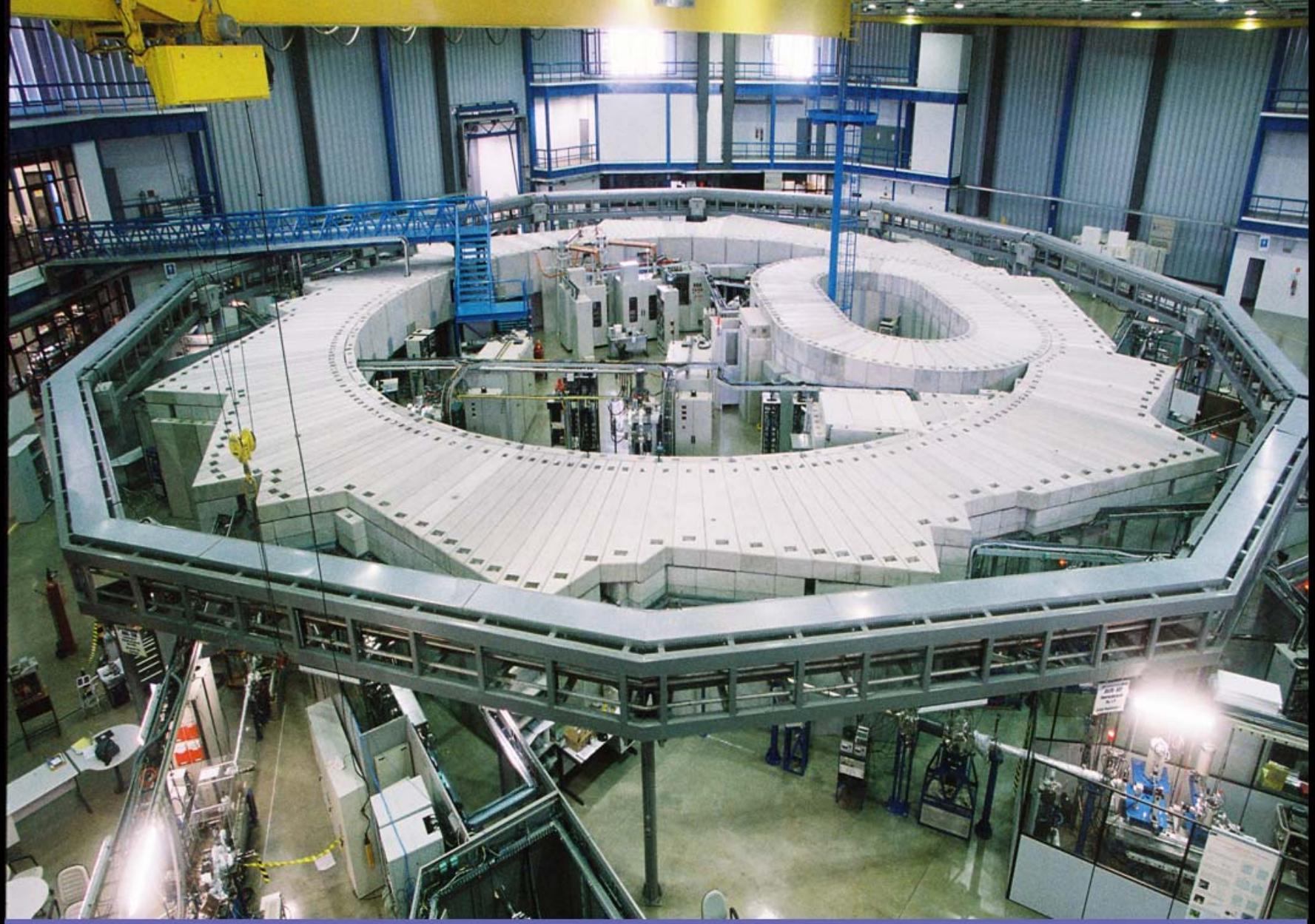
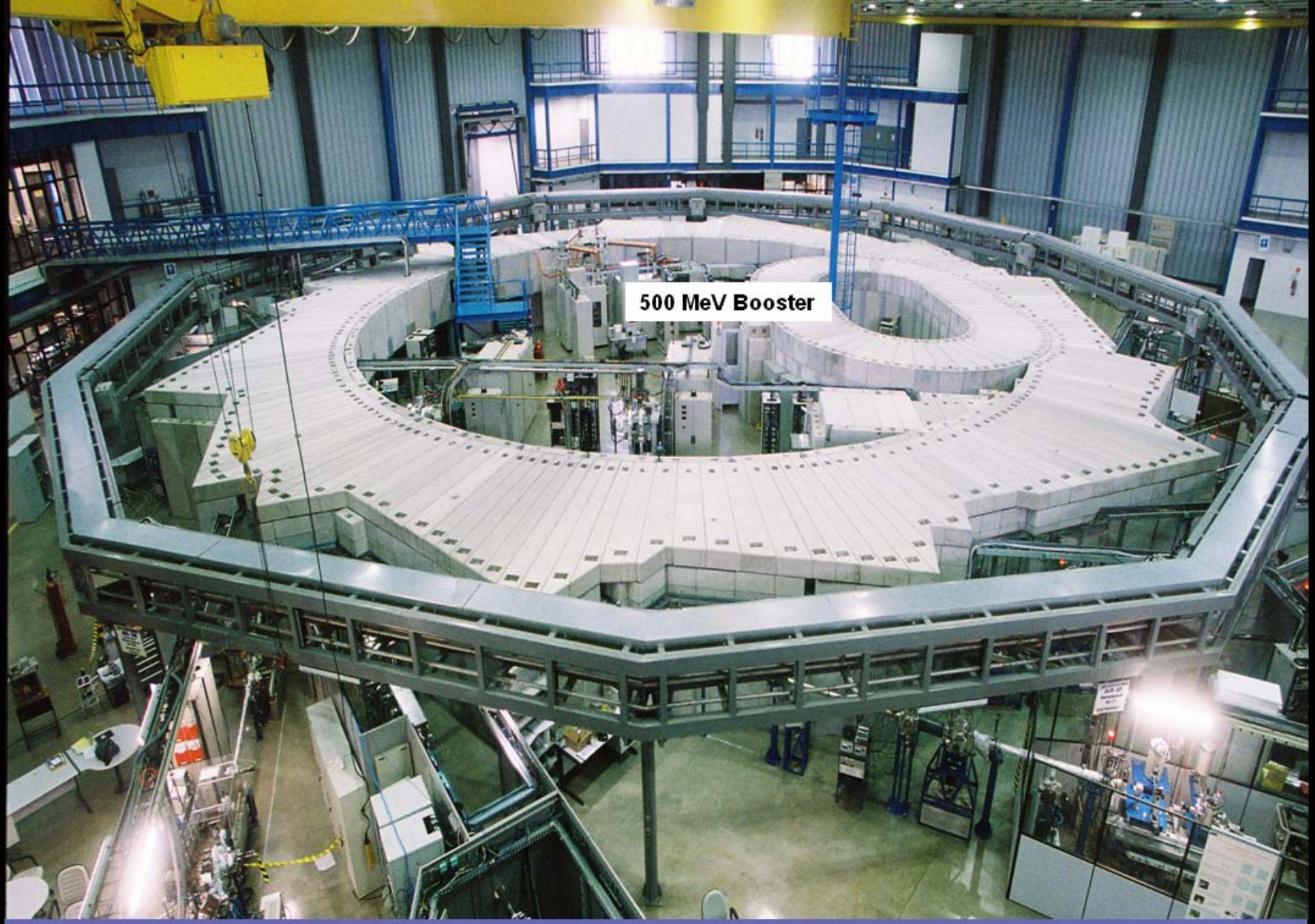
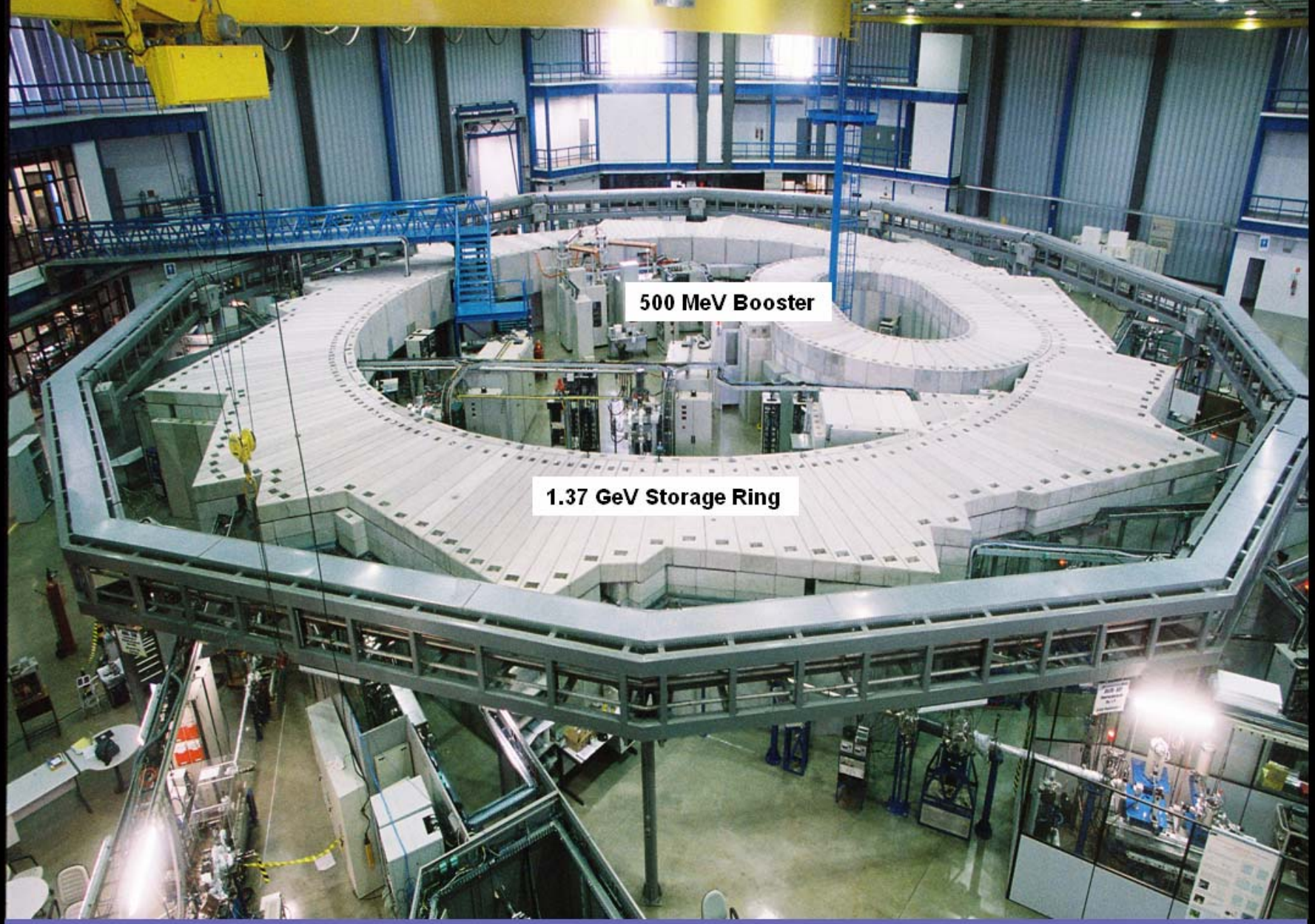
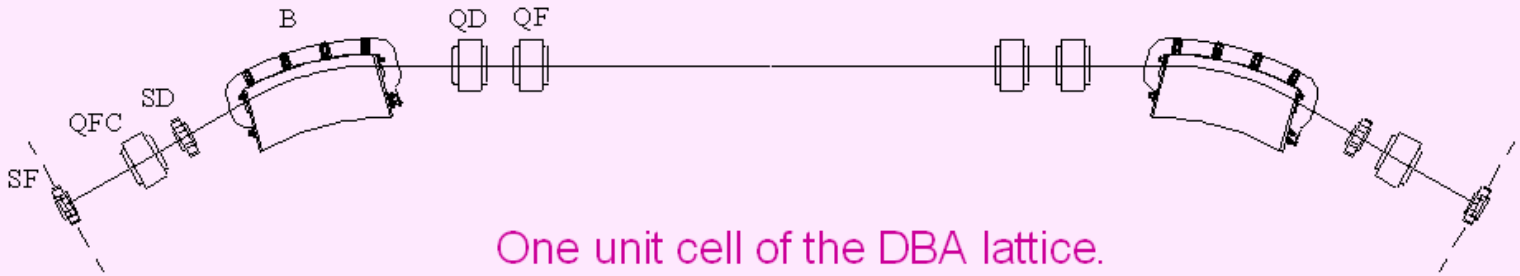



500 MeV Booster


500 MeV Booster
1.37 GeV Storage Ring

Some parameters of the storage ring

Energy	1.37	GeV
Injection energy	500	MeV
Circumference	93.2	m
Lattice	DBA	
# of long ss	6 (4 for IDs)	
Emittance	100	nm.rad
Initial current	250	mA
ε_c from dipoles	2.1	keV



One unit cell of the DBA lattice.

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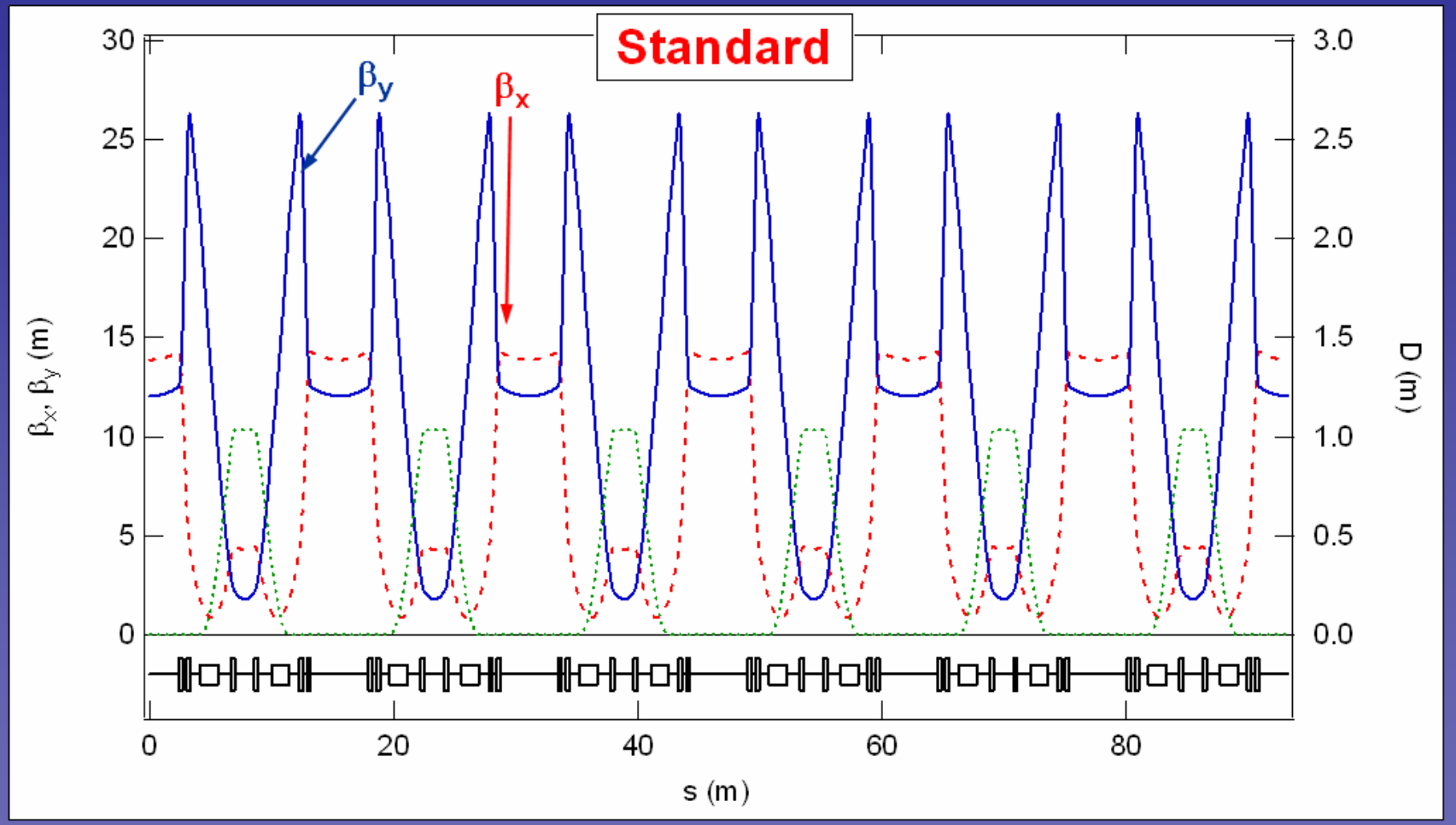
The Operation Modes for UVX



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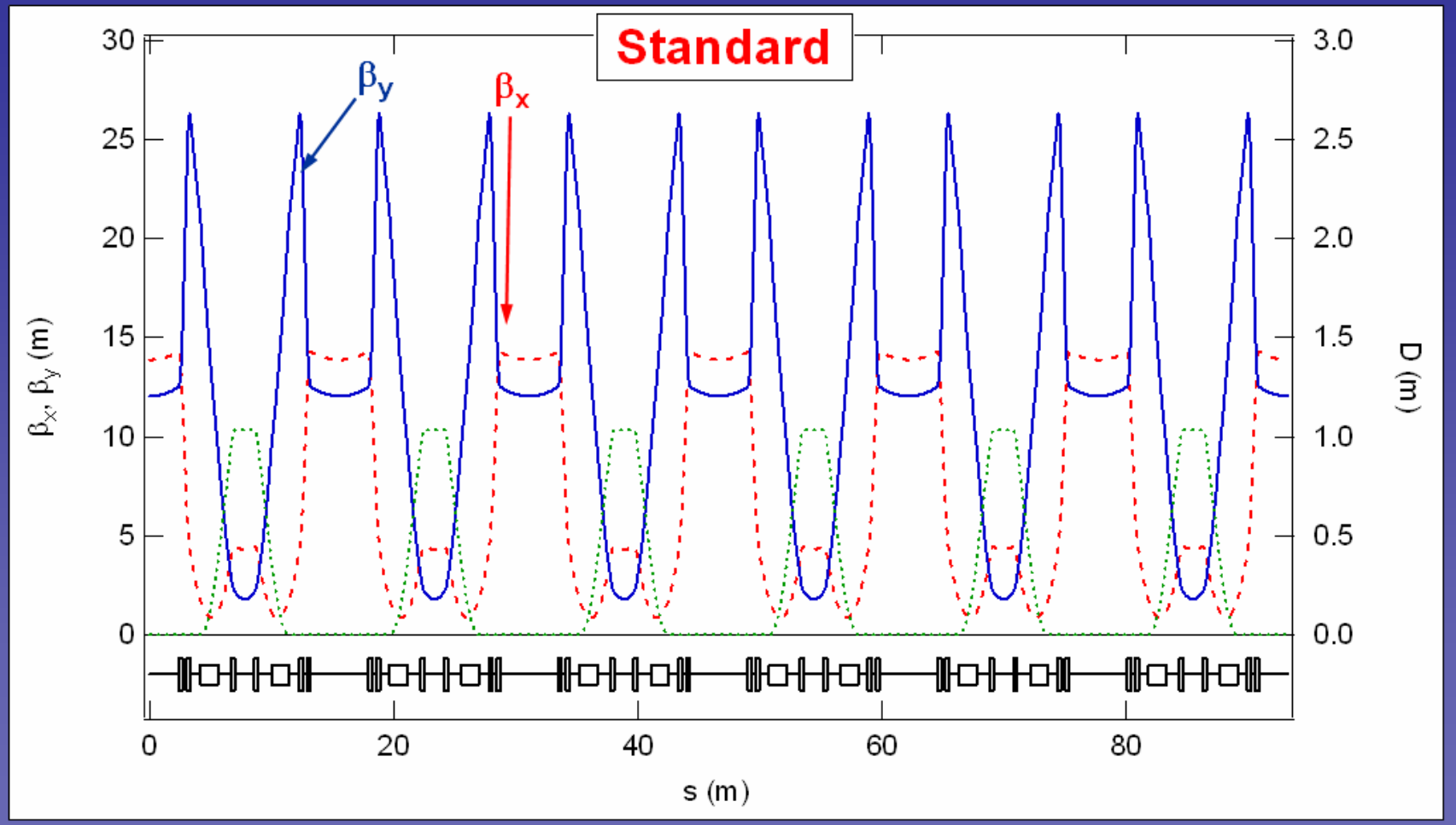

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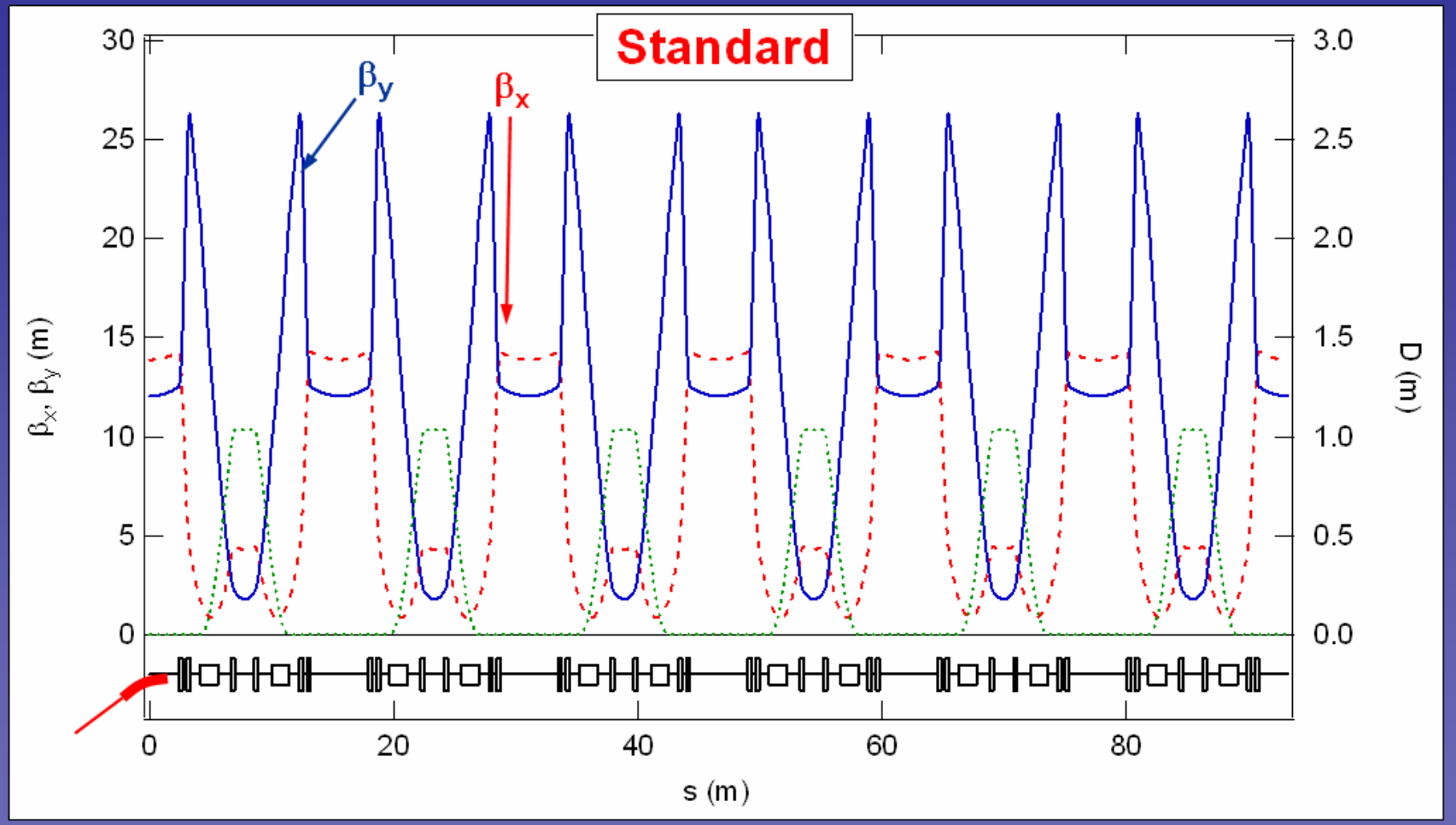

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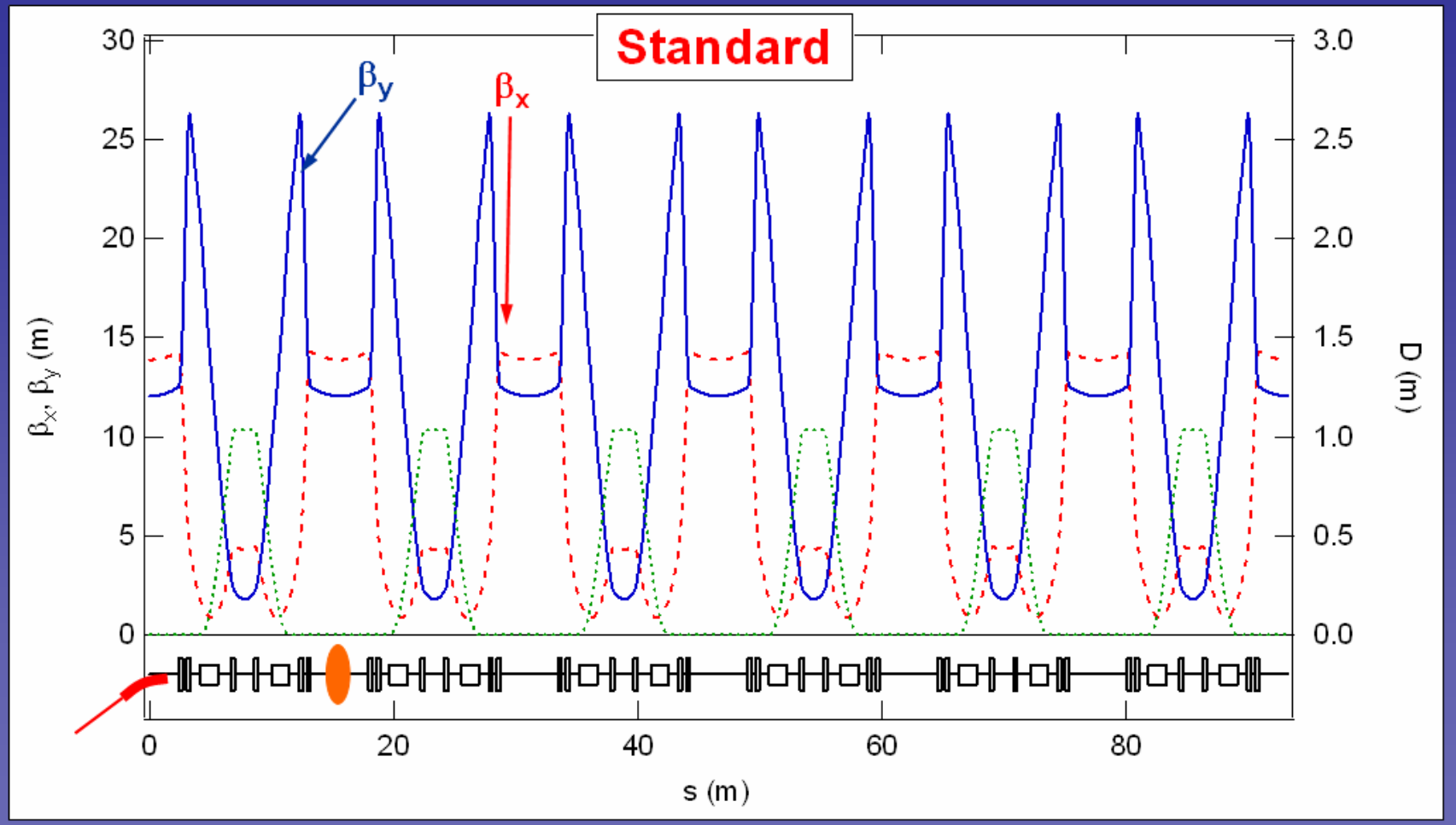

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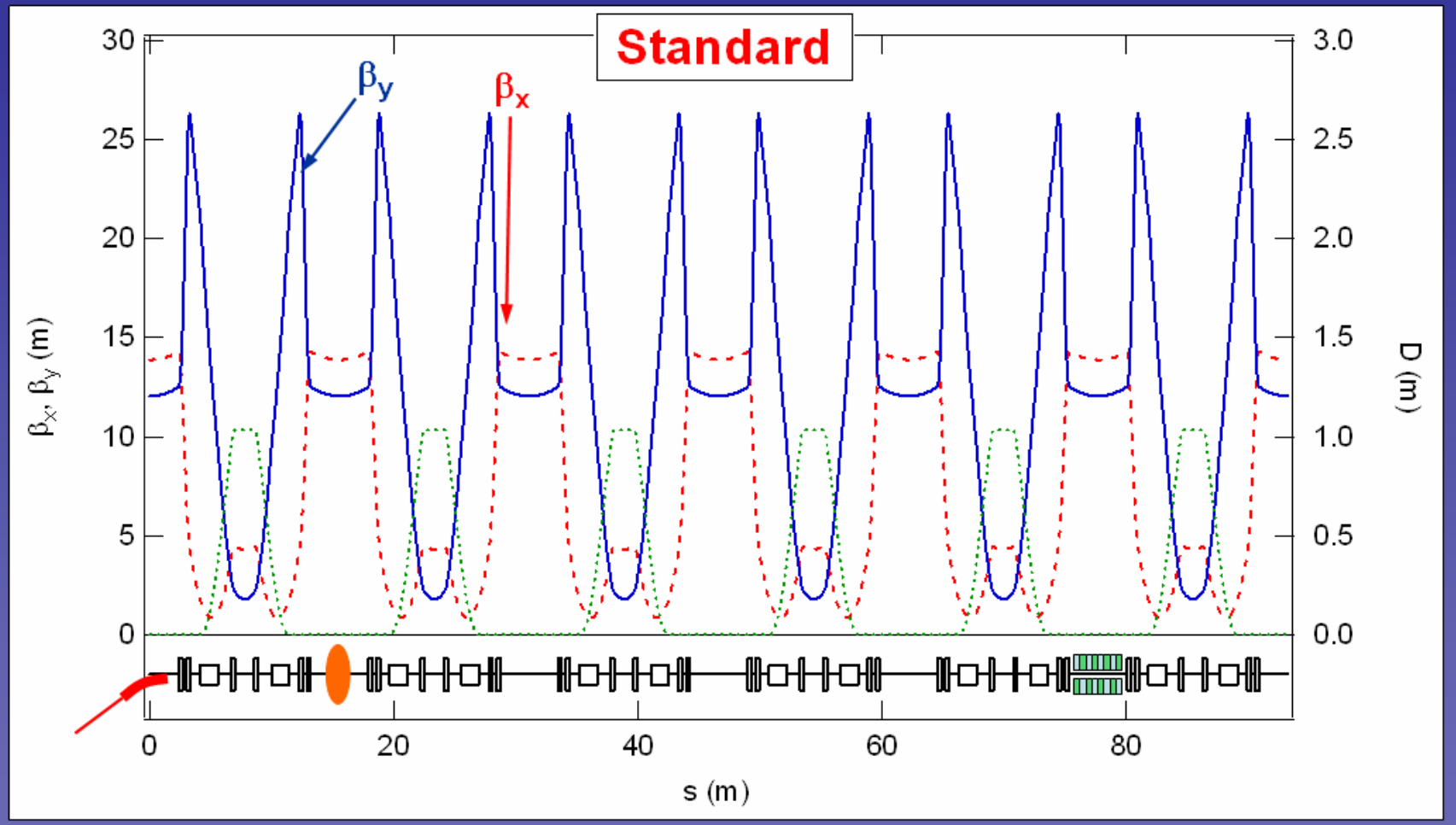

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2T WIG

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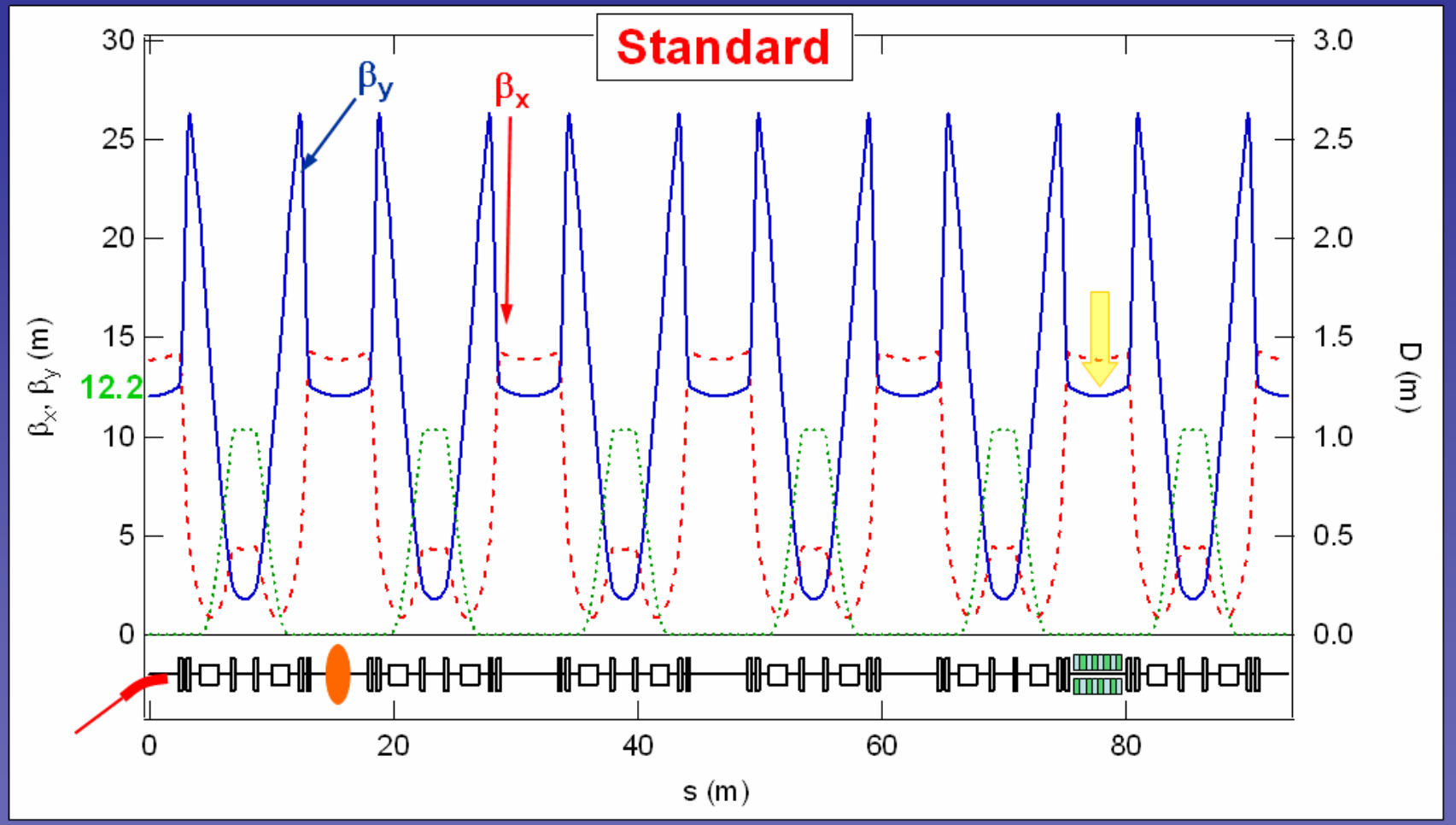

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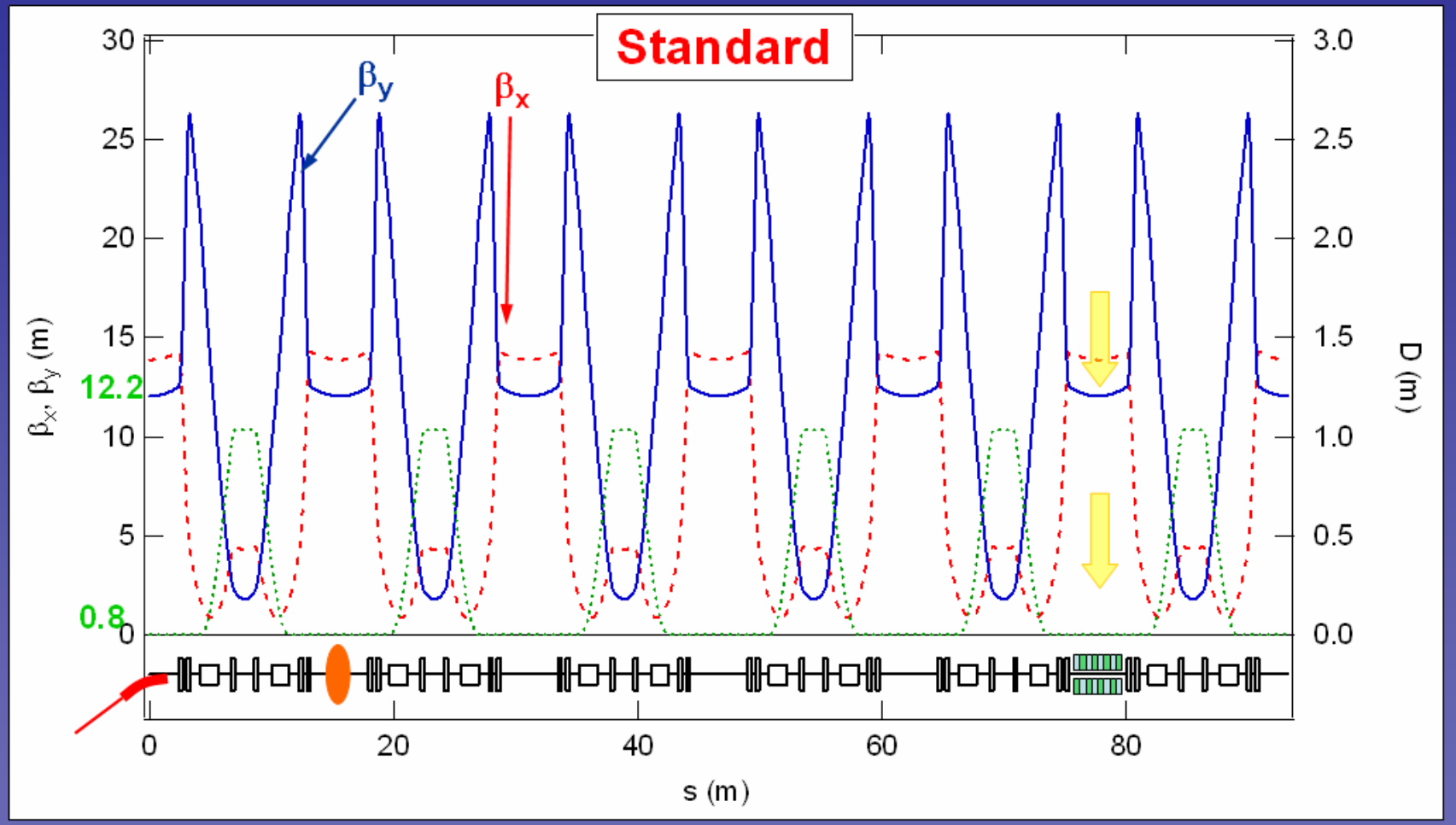

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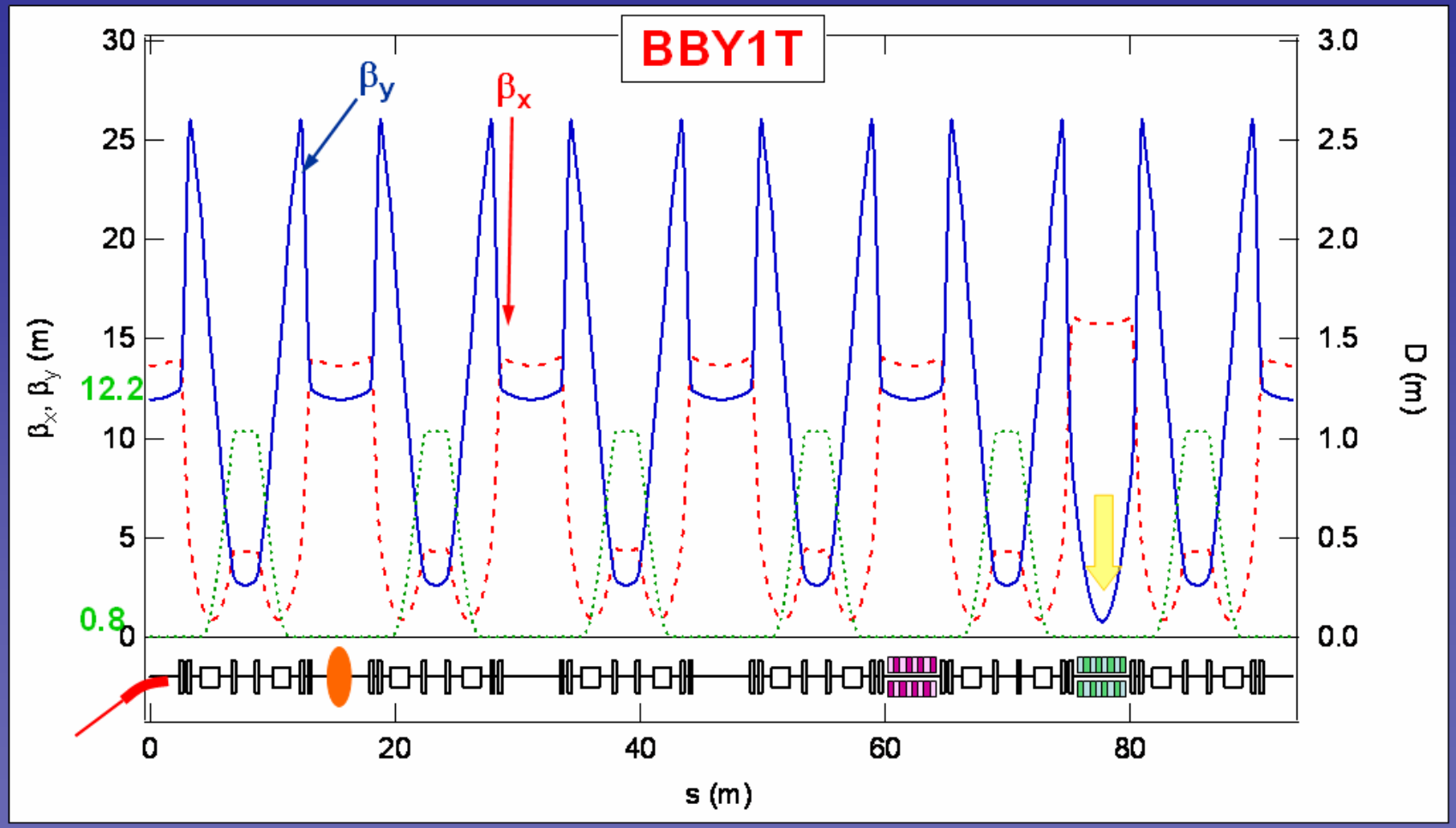

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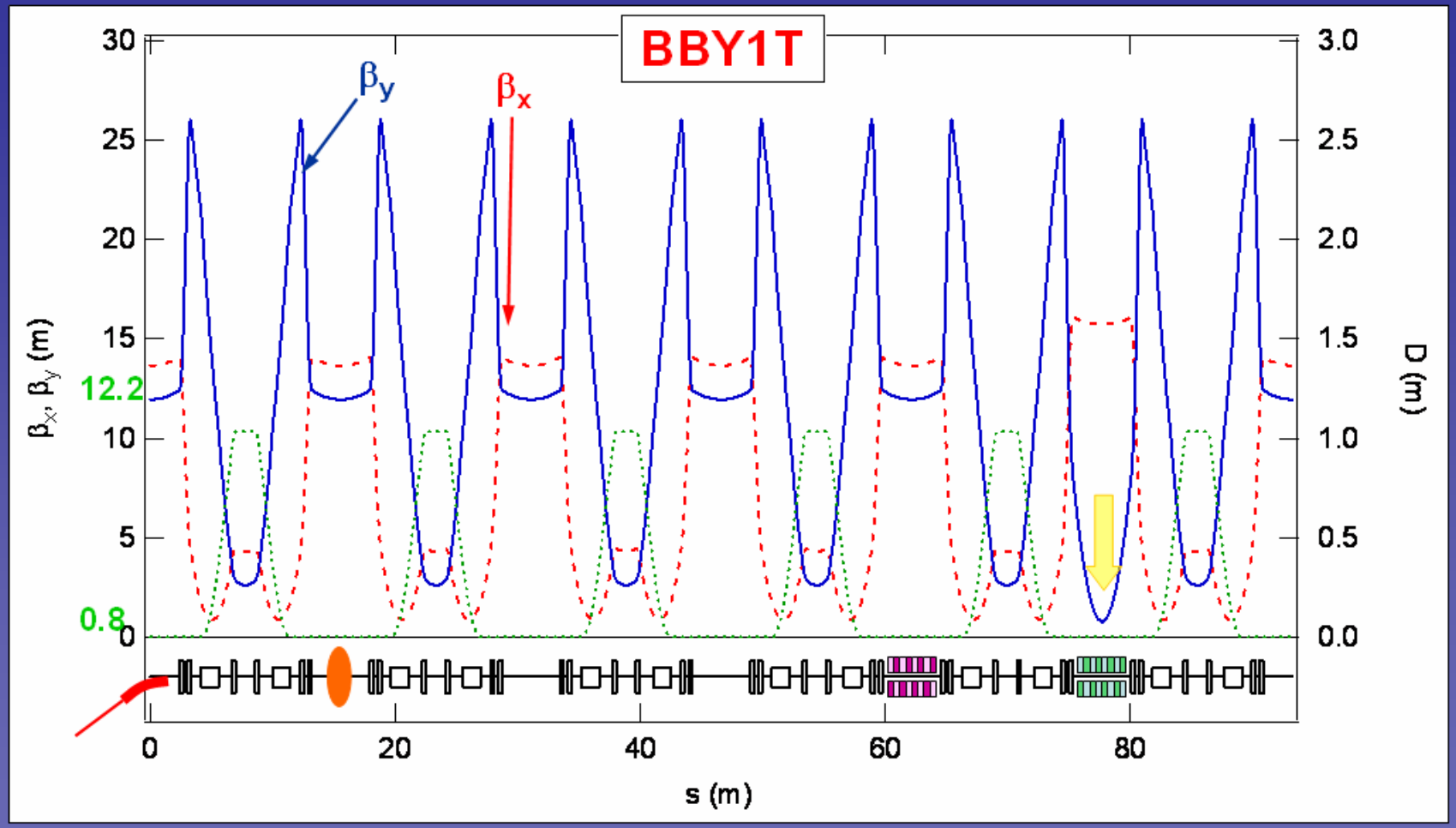

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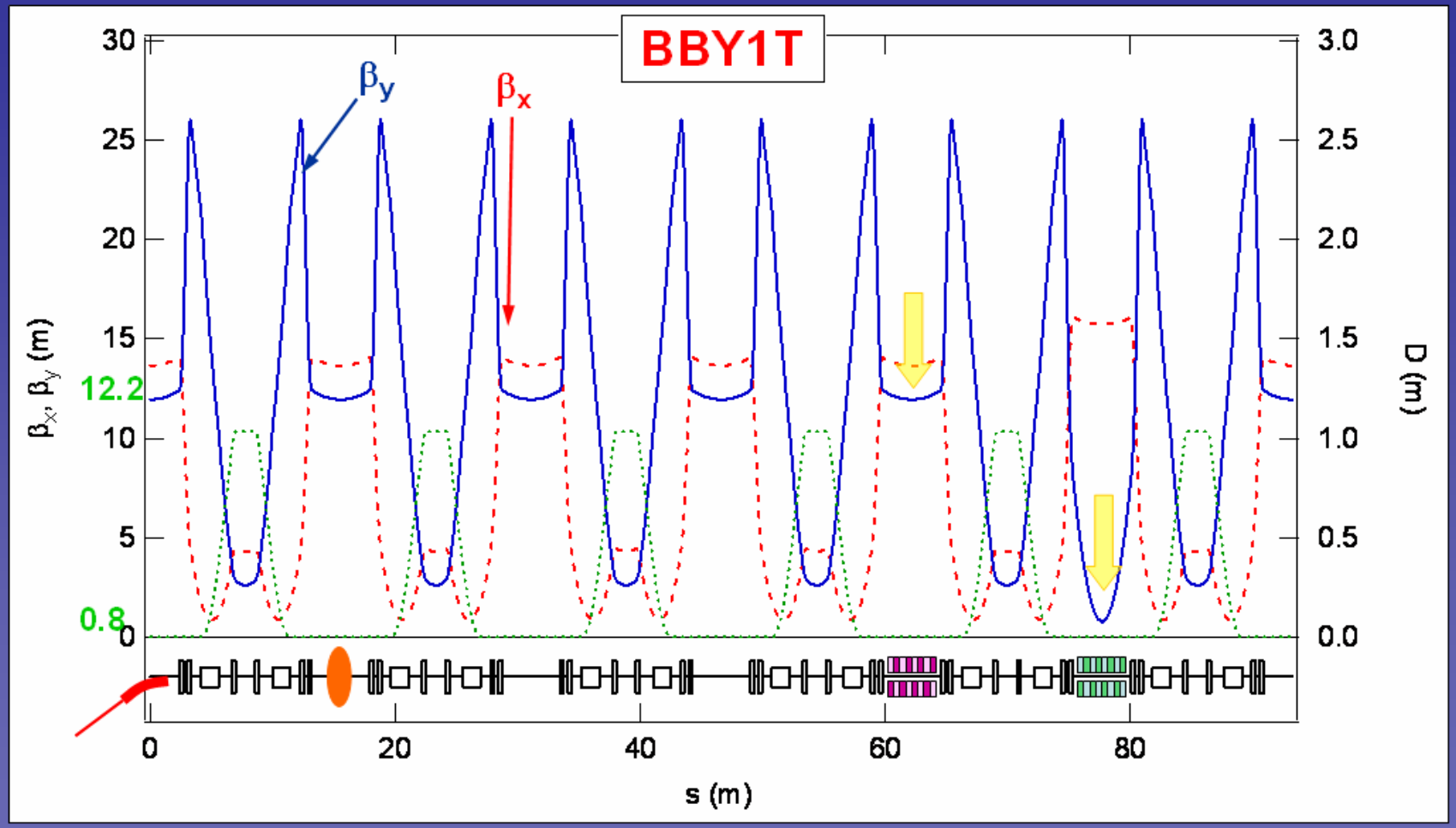

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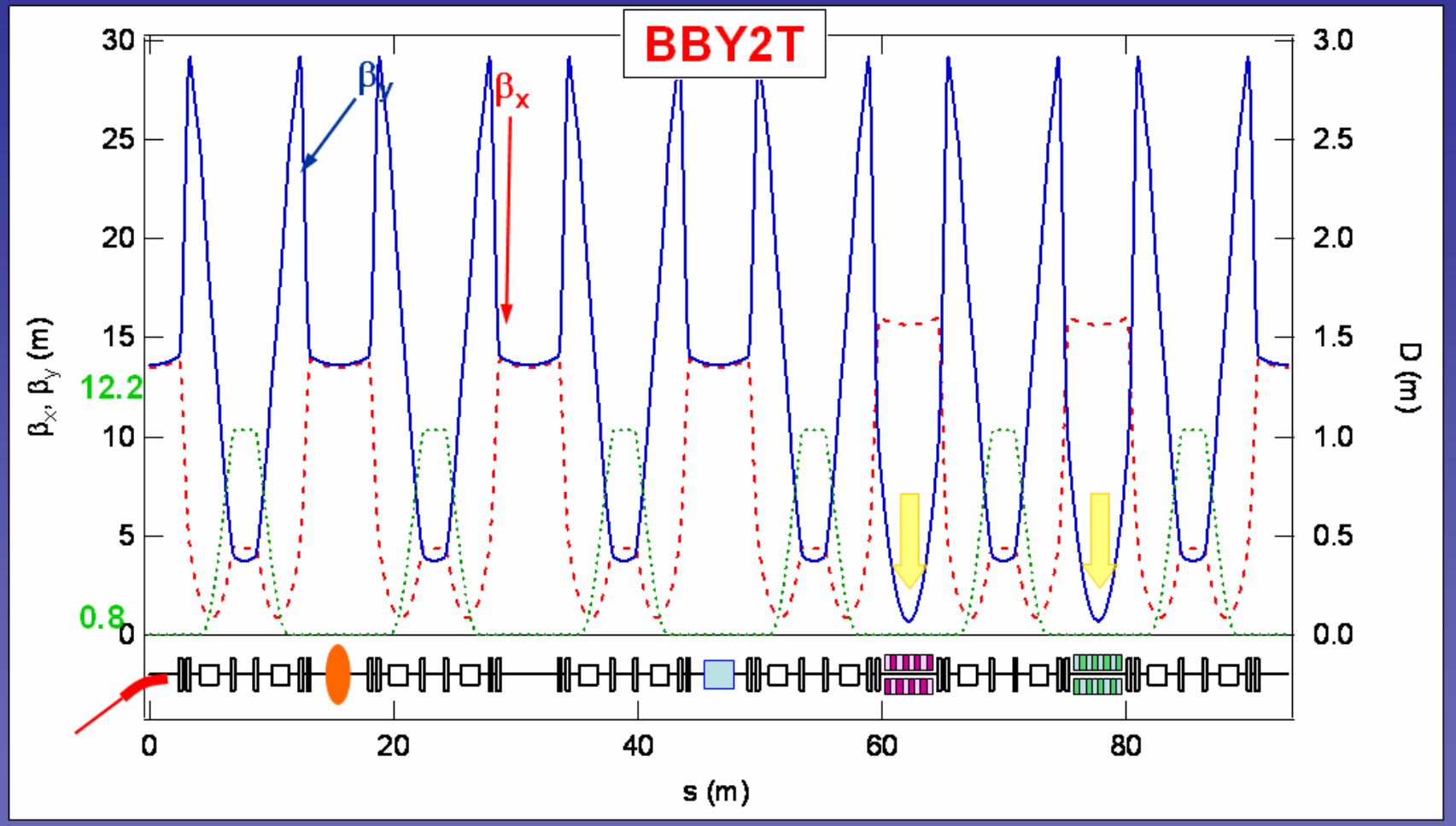

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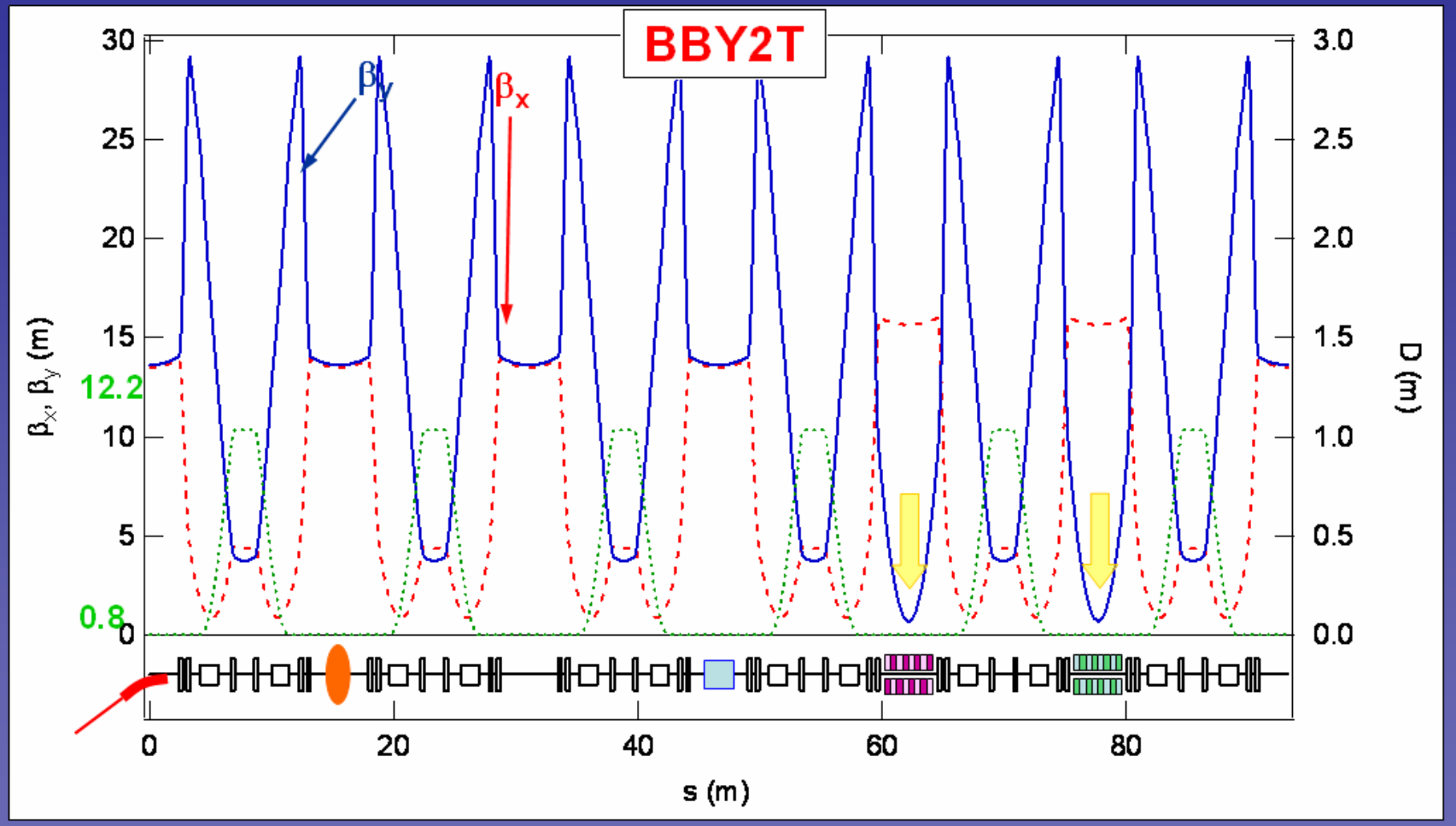

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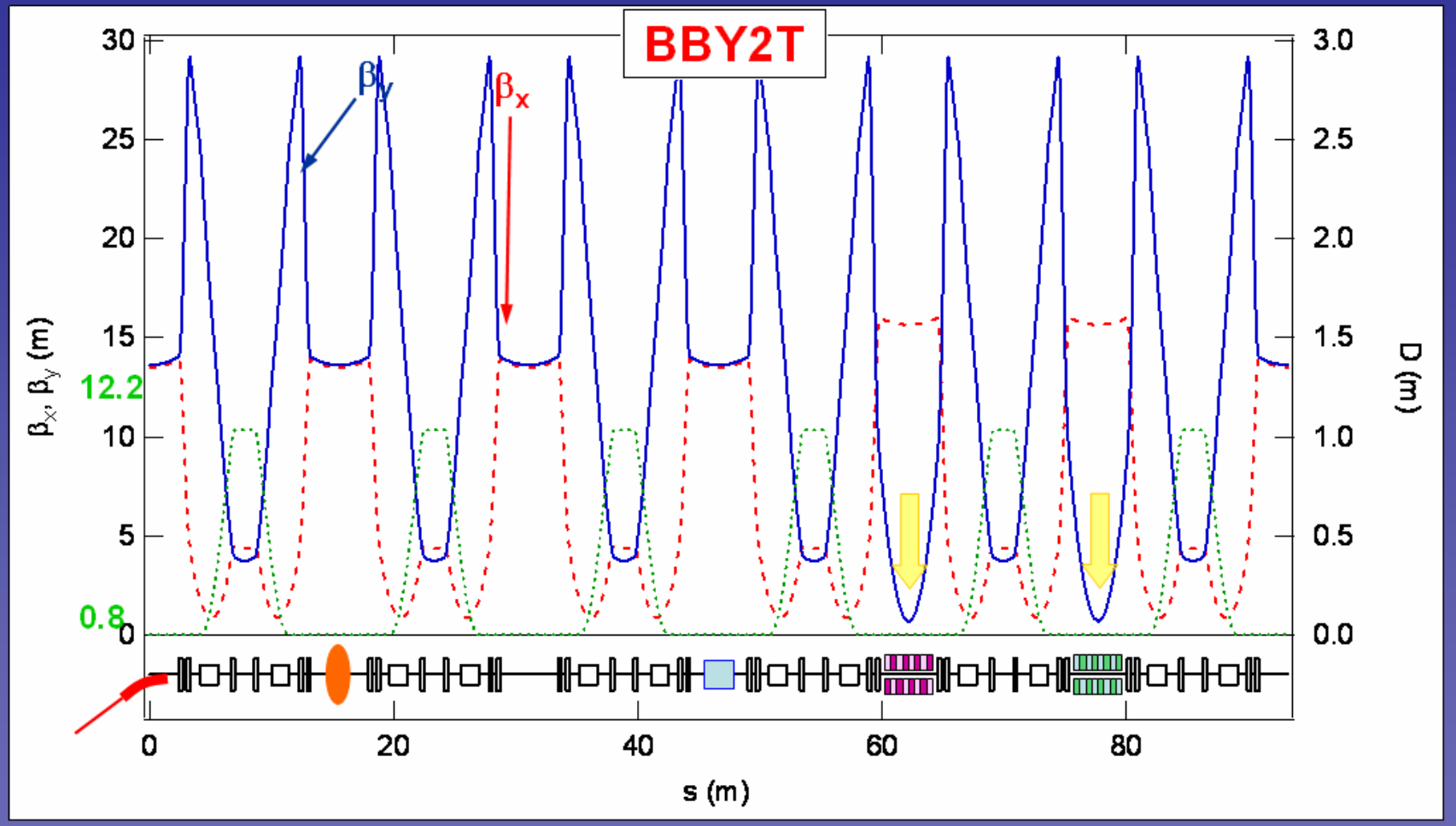

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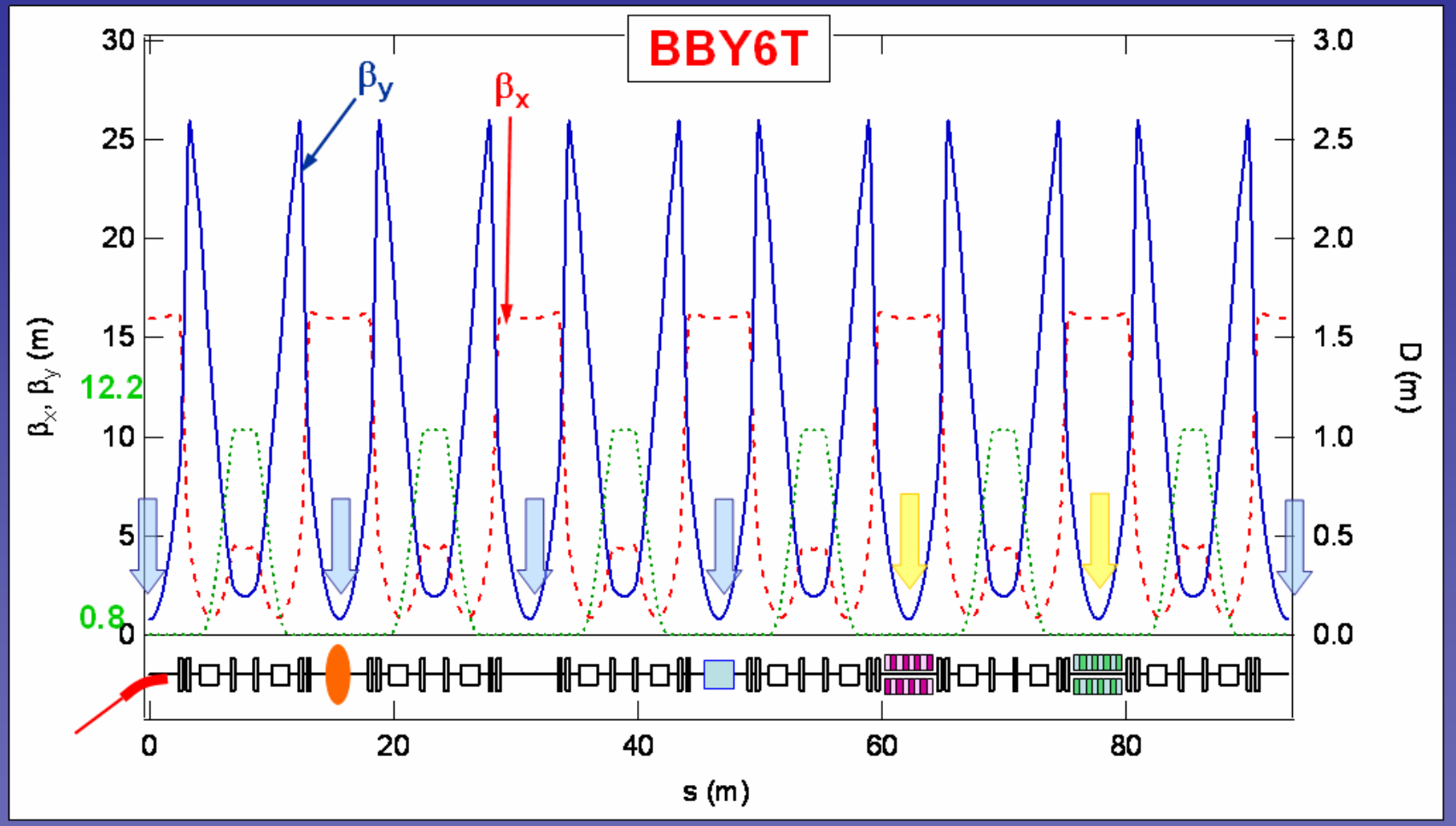

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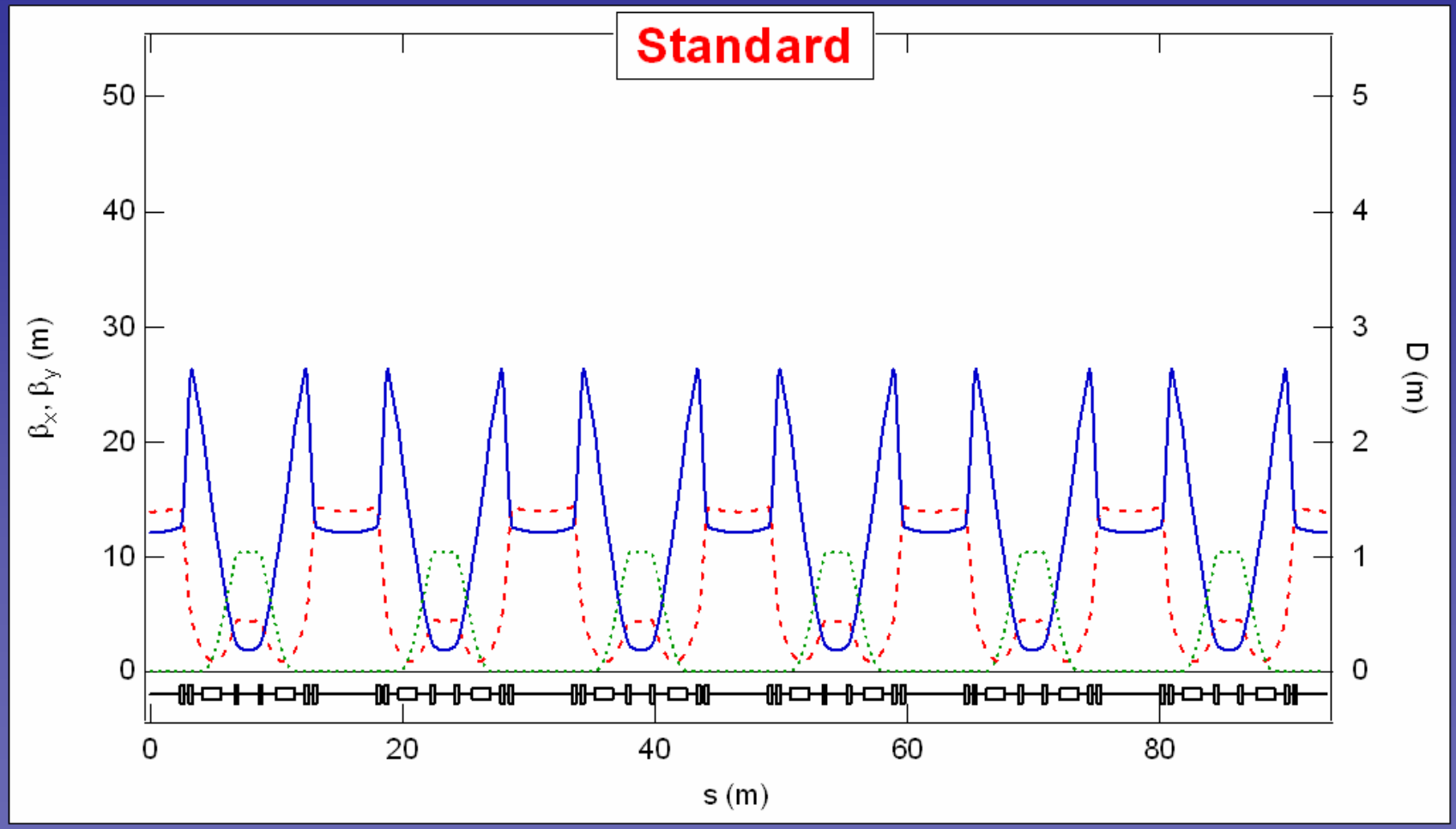
First order focussing effect of 2T WIG



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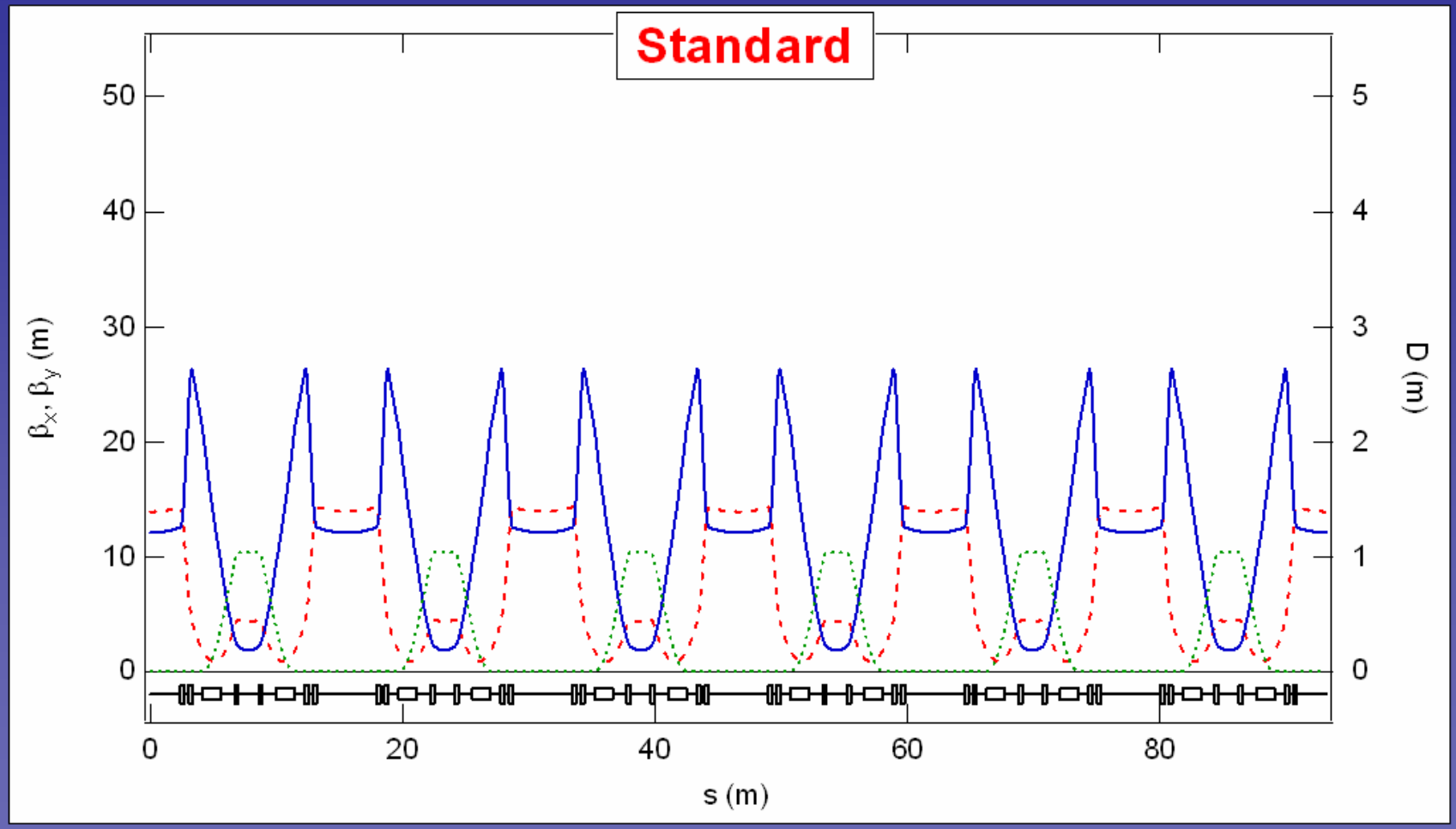

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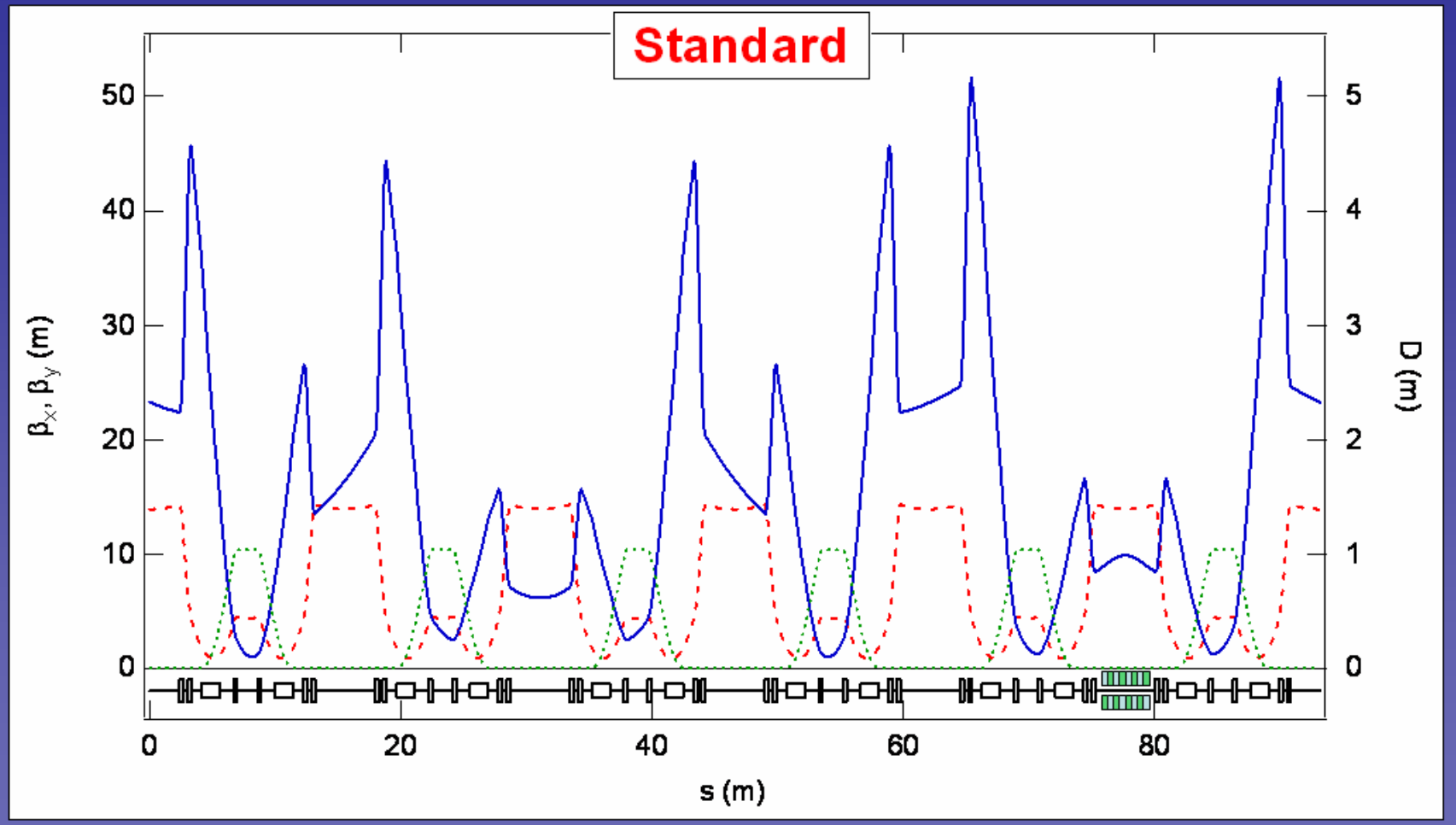

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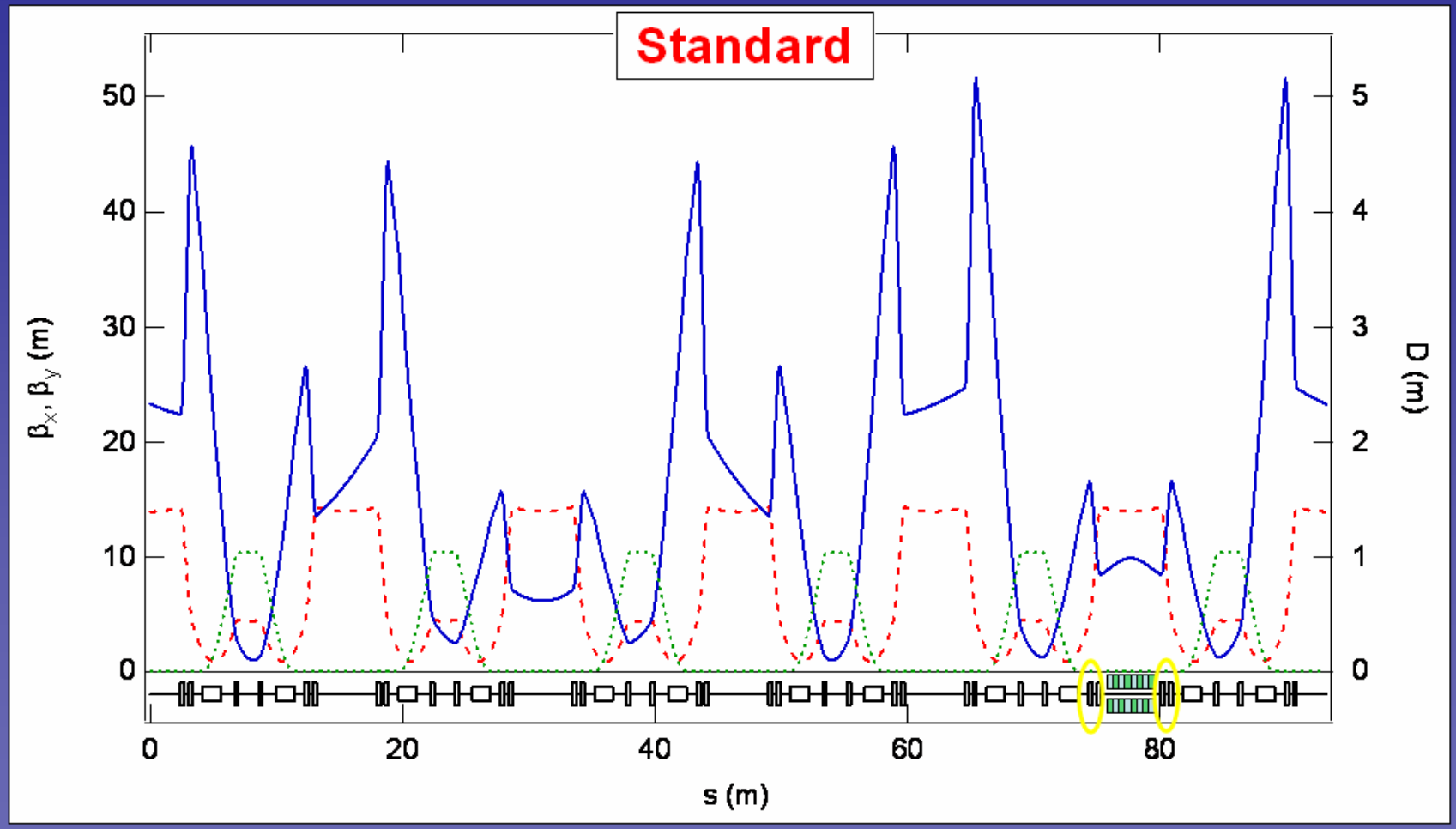

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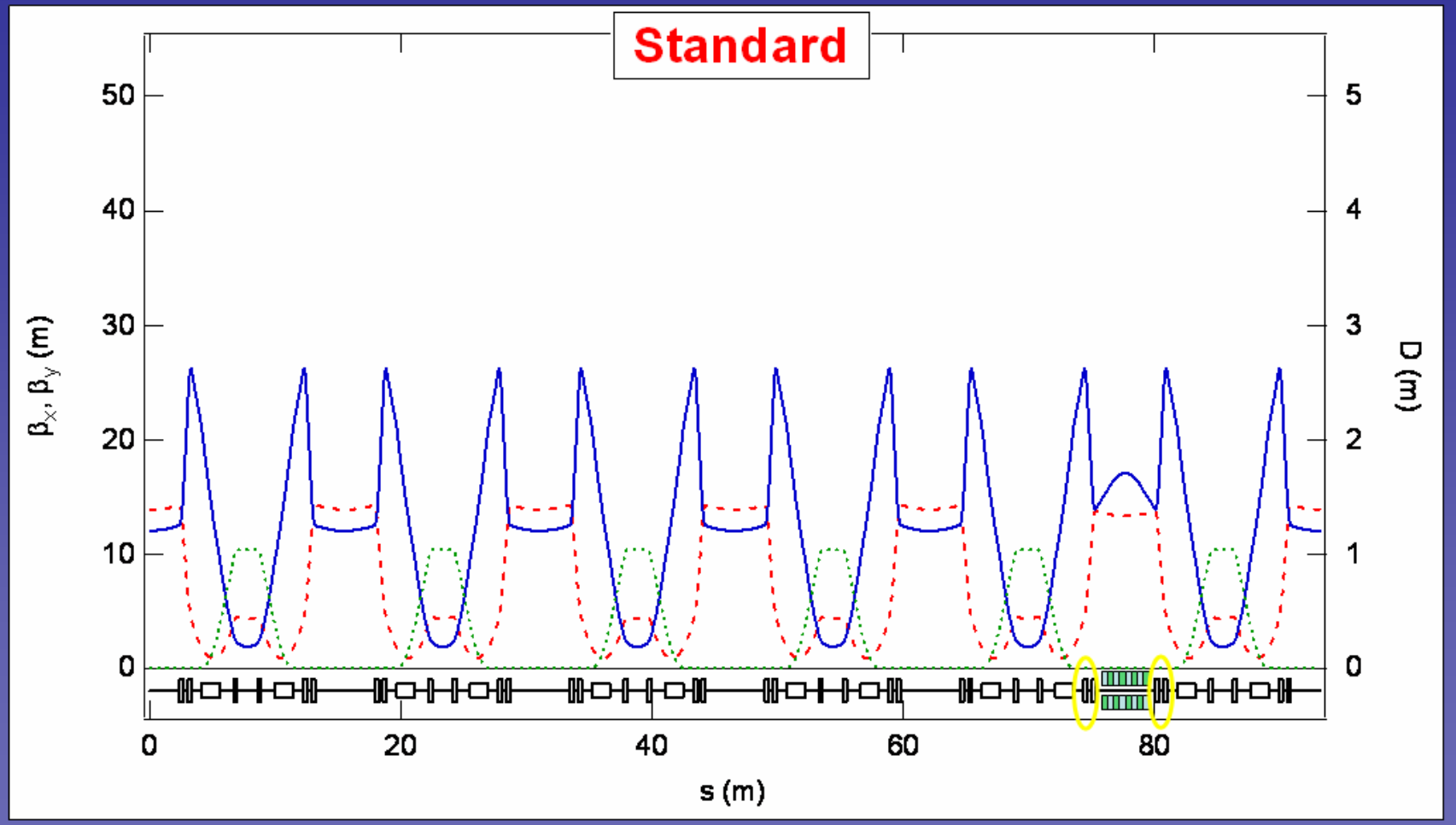

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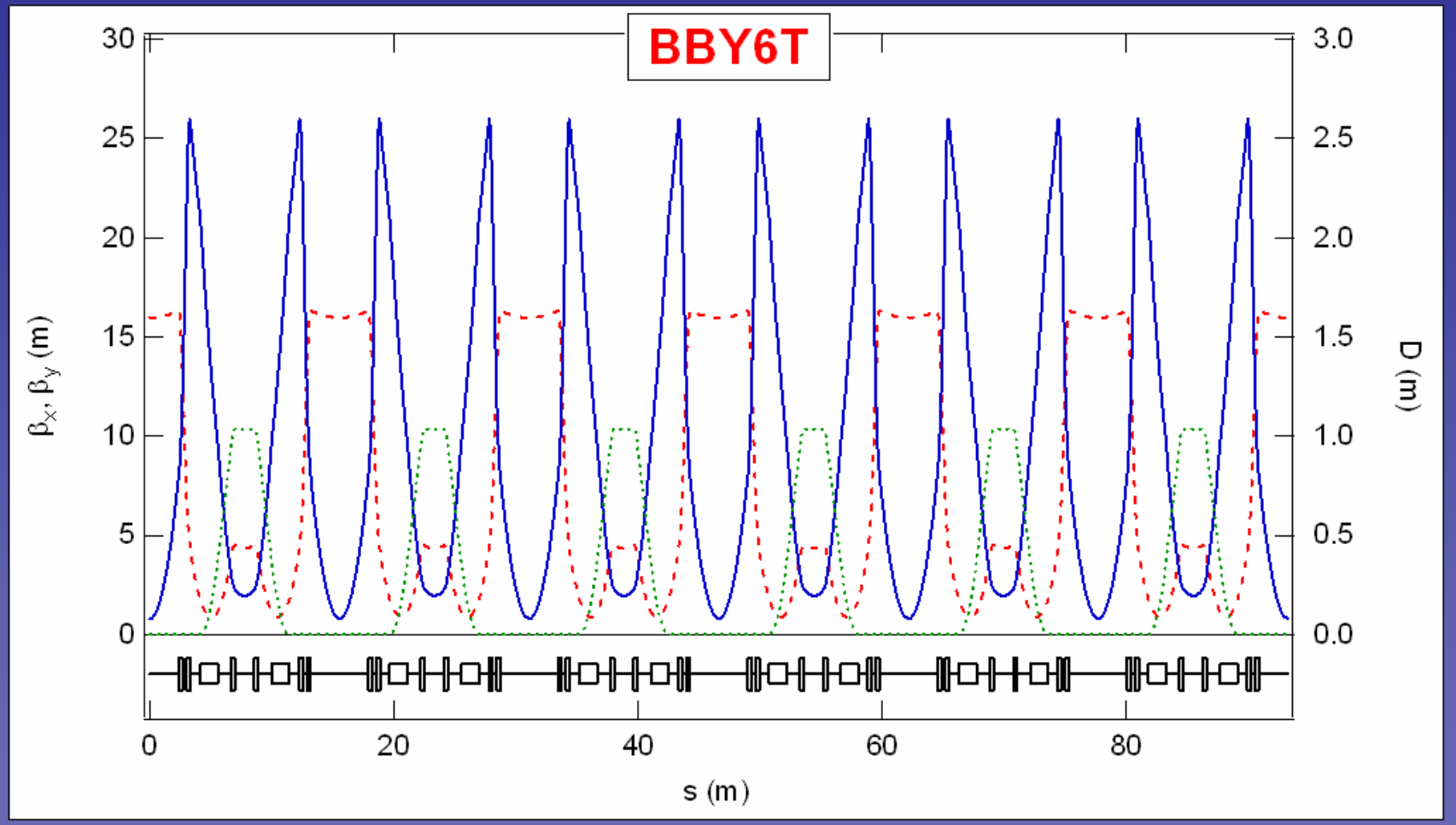

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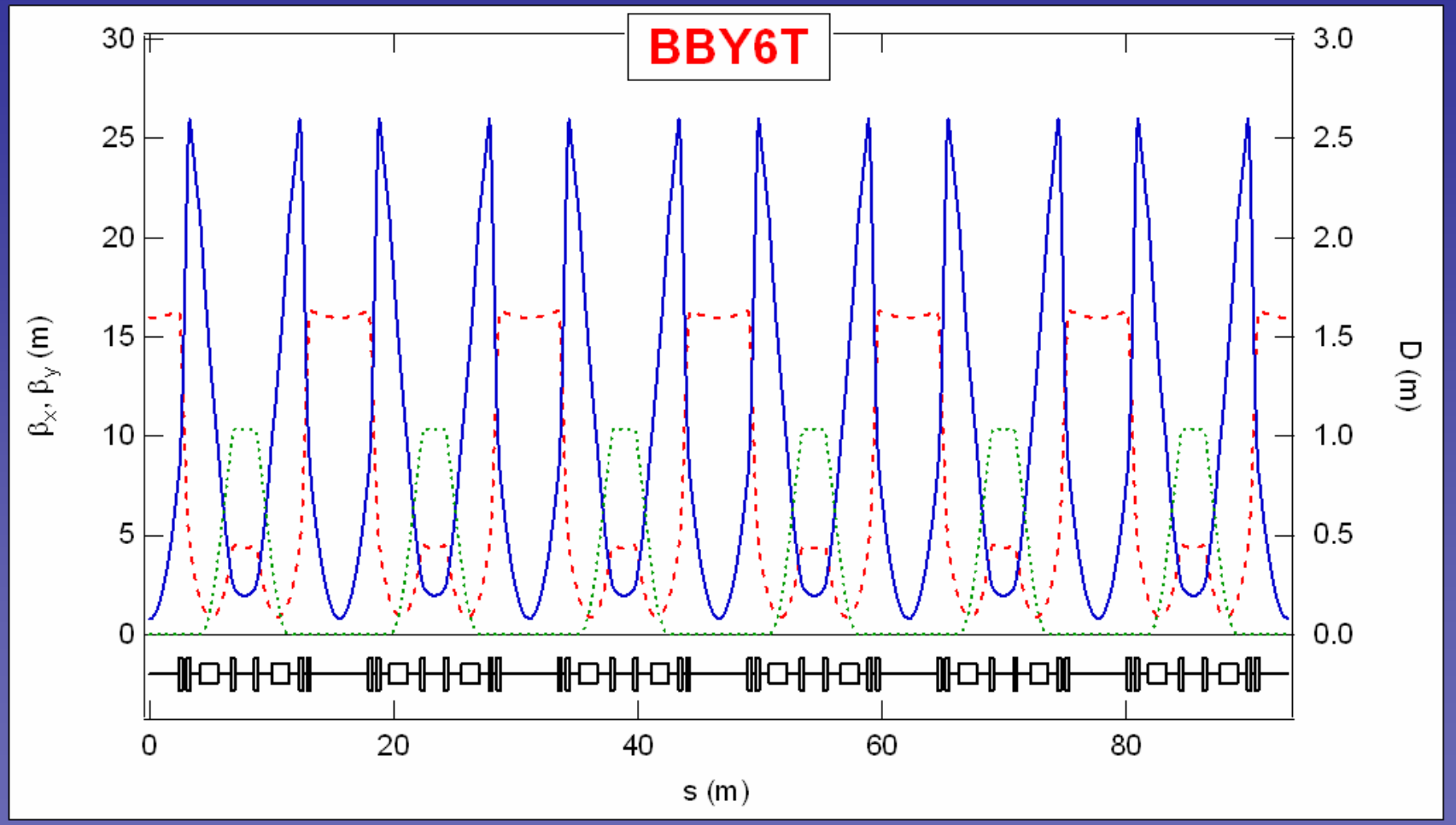

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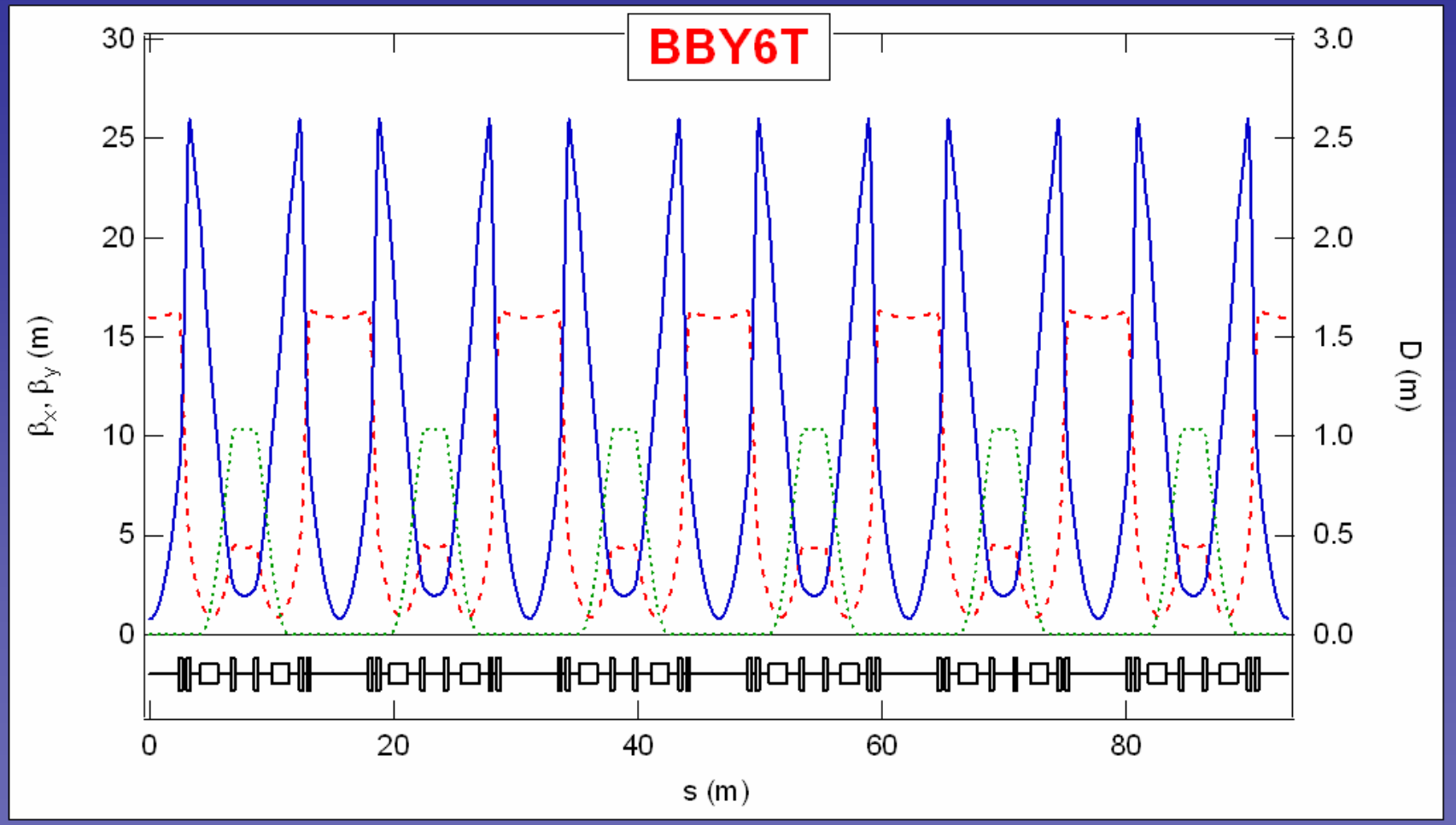

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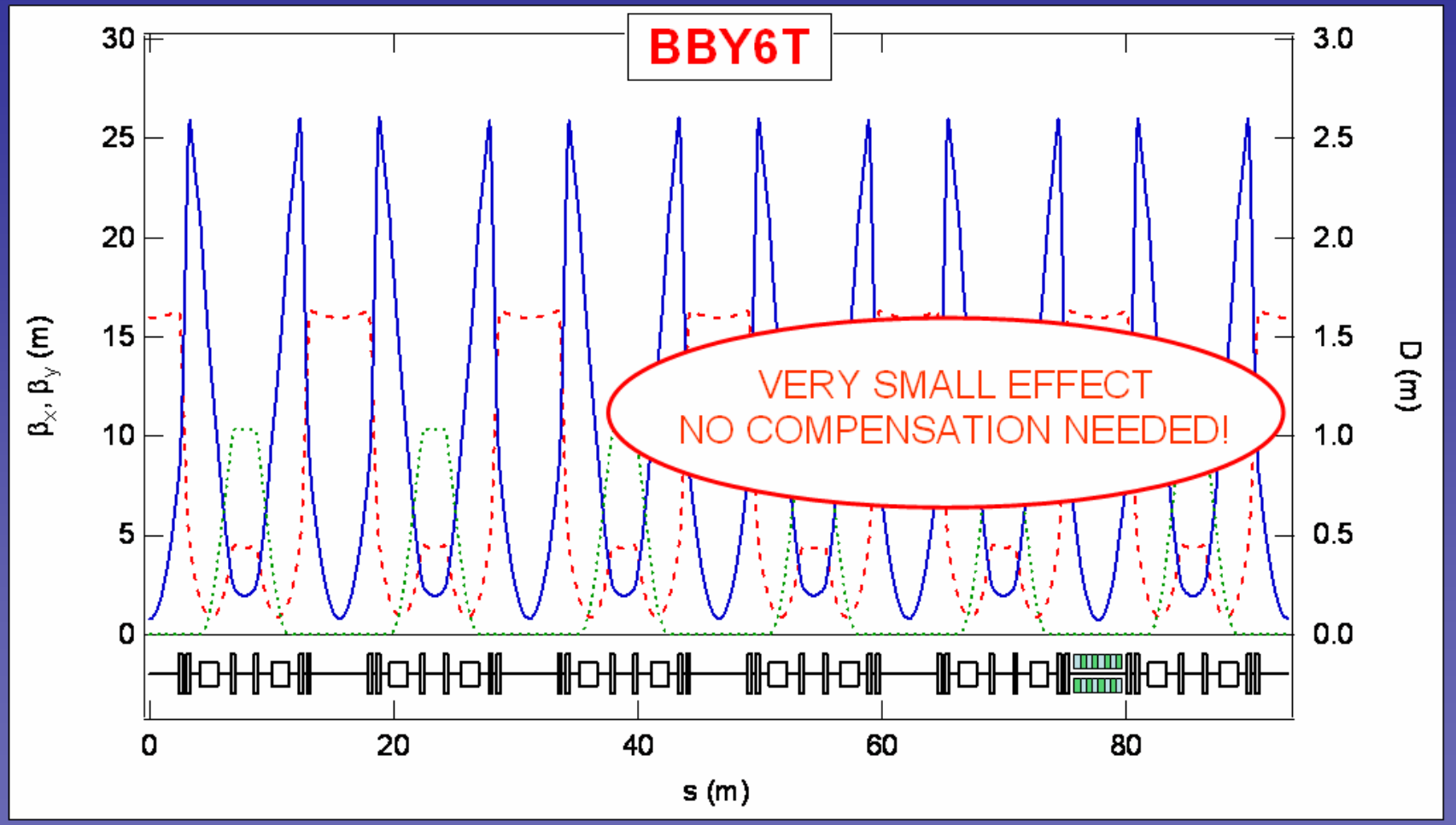

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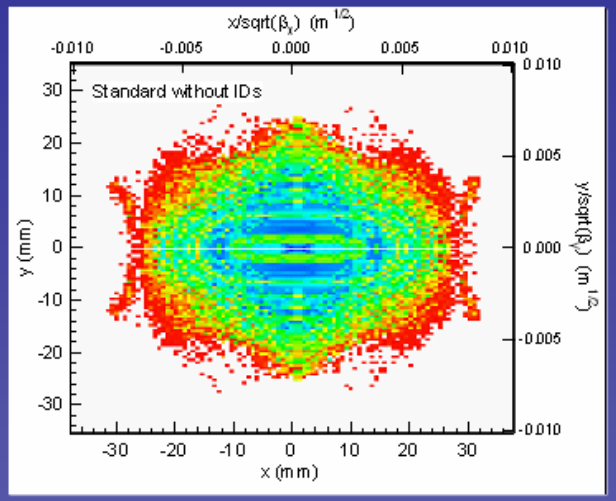
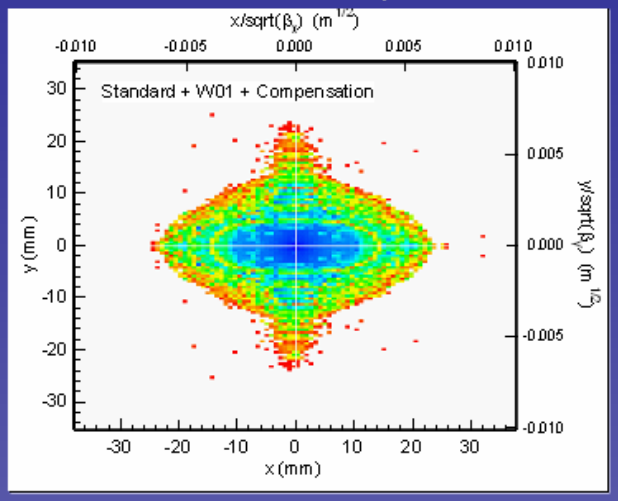
Higher order effects of 2T WIG – Dynamic aperture

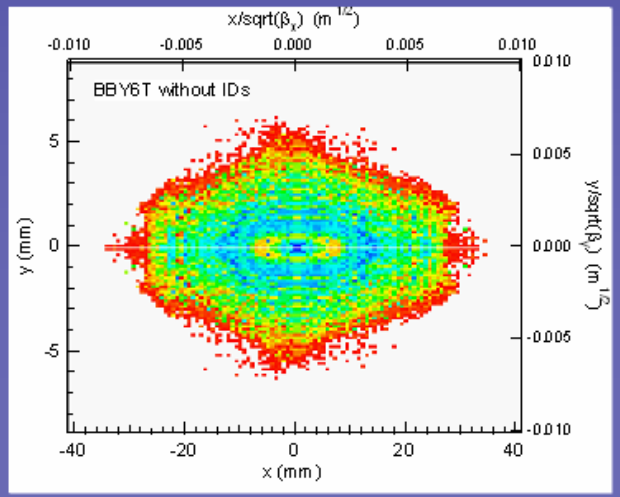
Standard mode without IDs



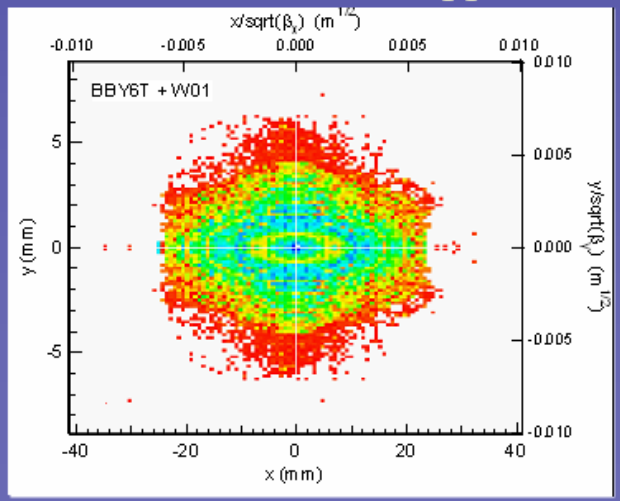
Standard mode + compensation + Wiggler



BBY6T mode without IDs



BBY6T mode + Wiggler



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Commissioning of BBY6T mode

Commissioning in this case involves 3 stages:

- Injection and accumulation of 250 mA @ 500 MeV (injection energy).
- Ramp up to 1.37 GeV (operation energy).
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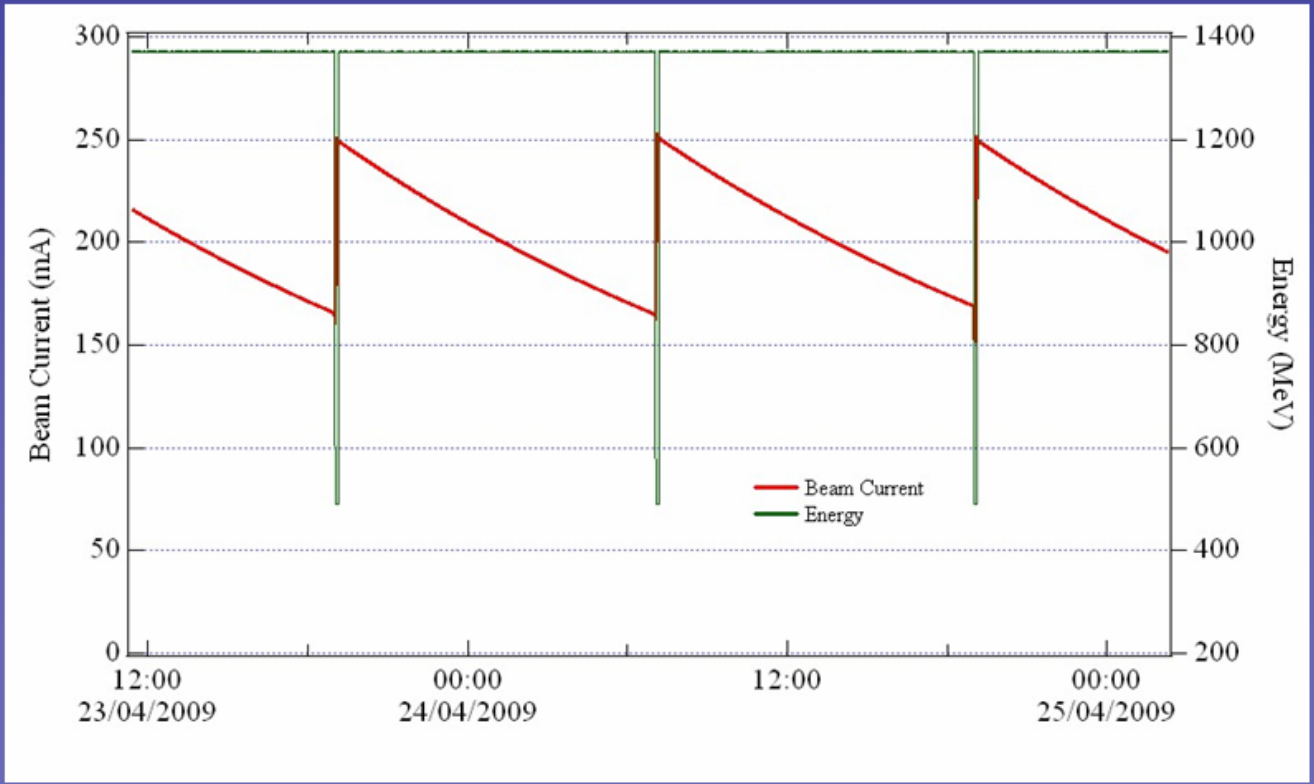

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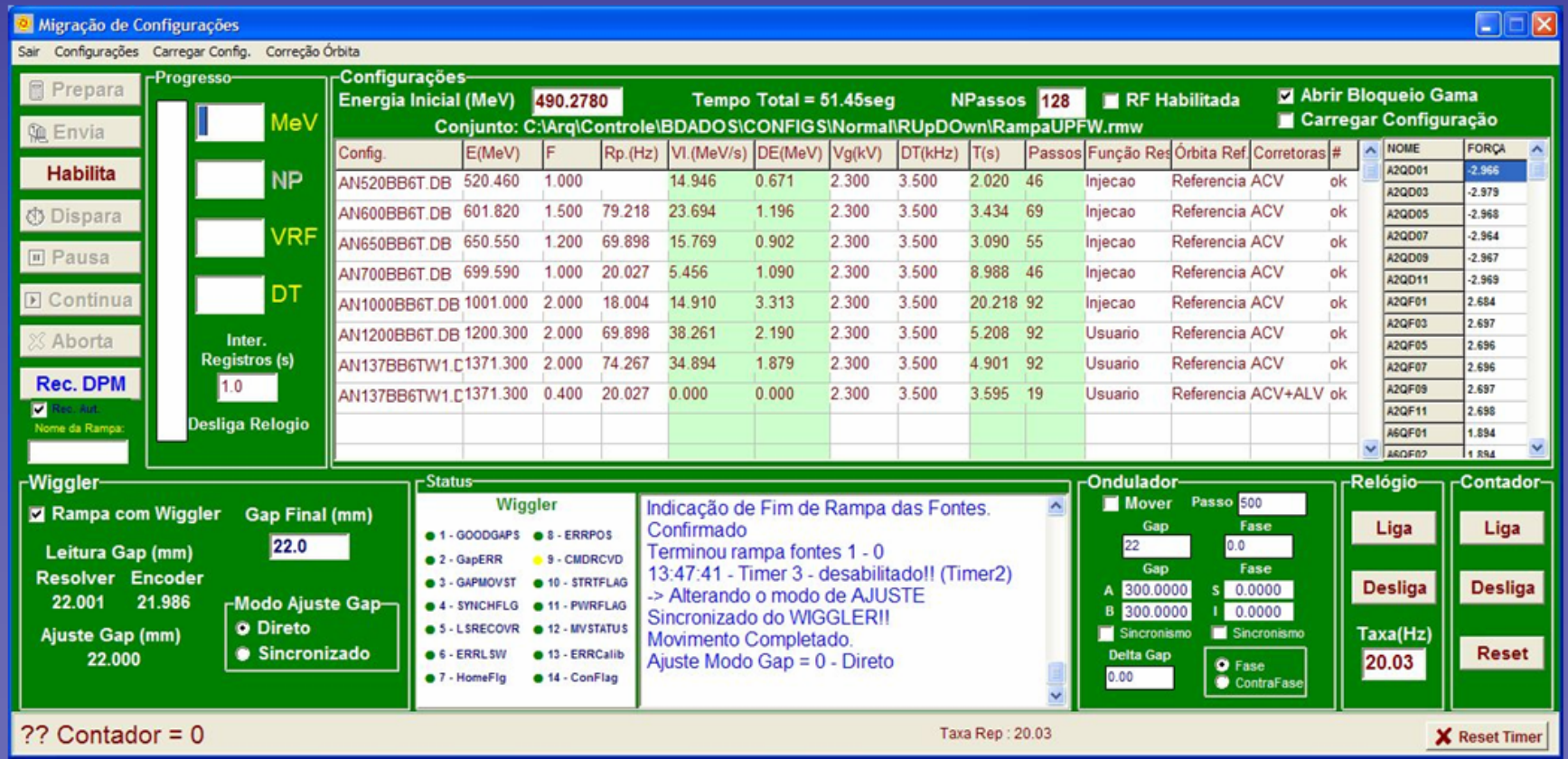

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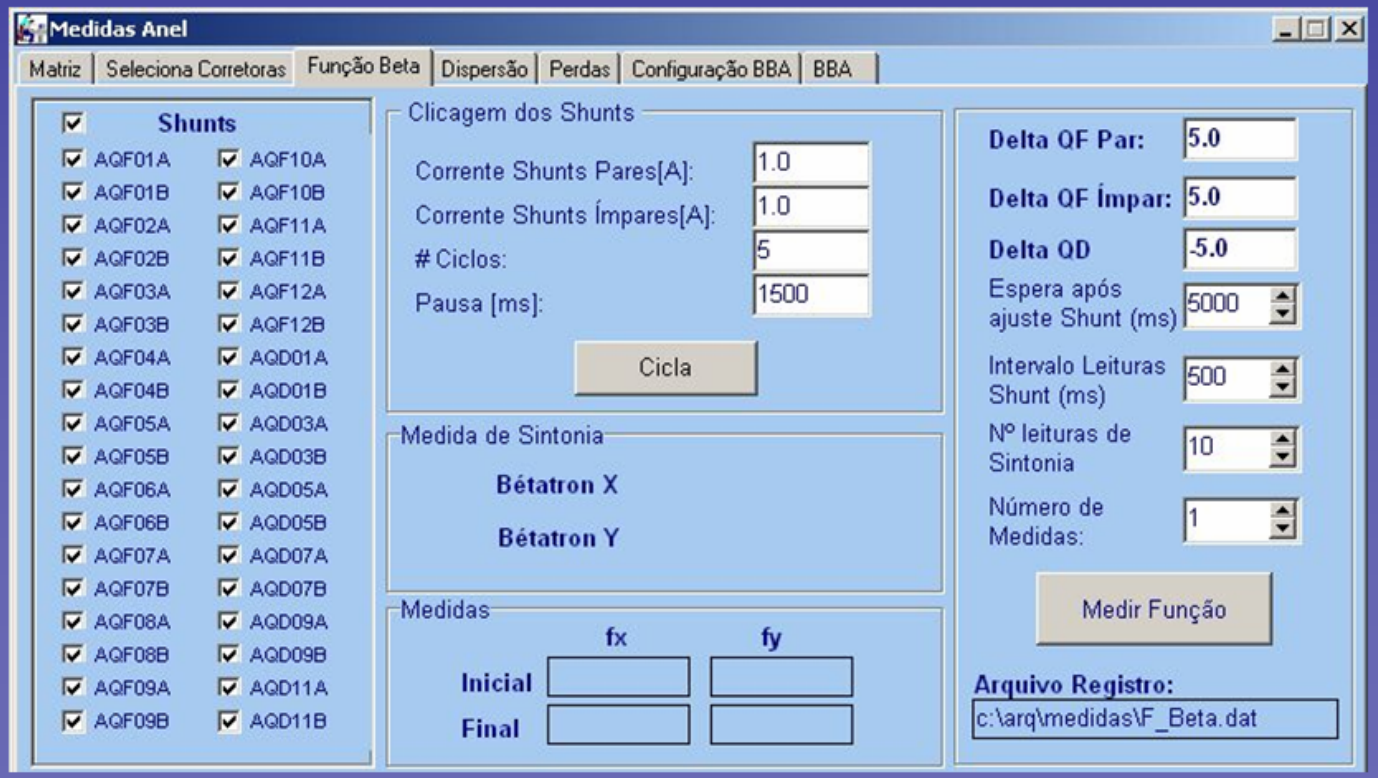
Characterization of BBY6T

Series of beam dynamics measurements.
- Program for measurement automatization.



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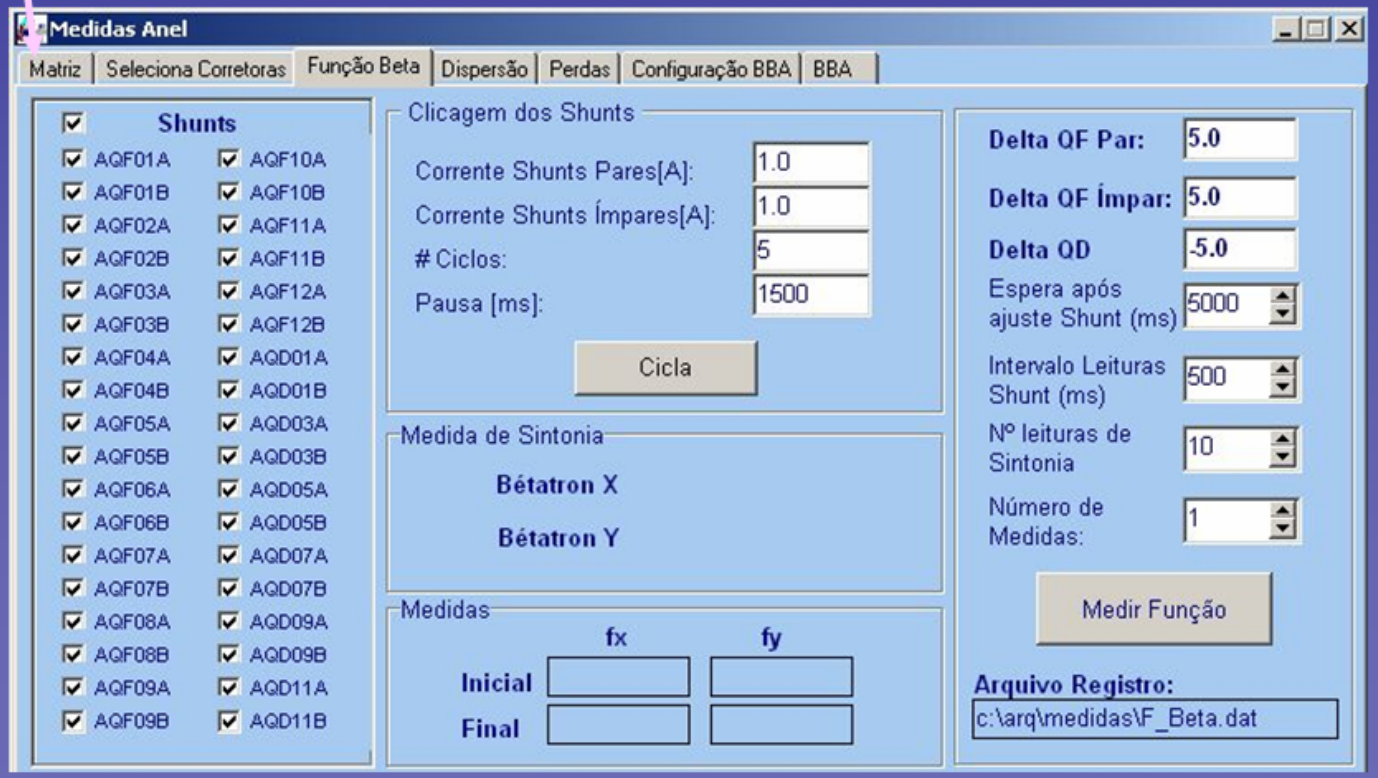

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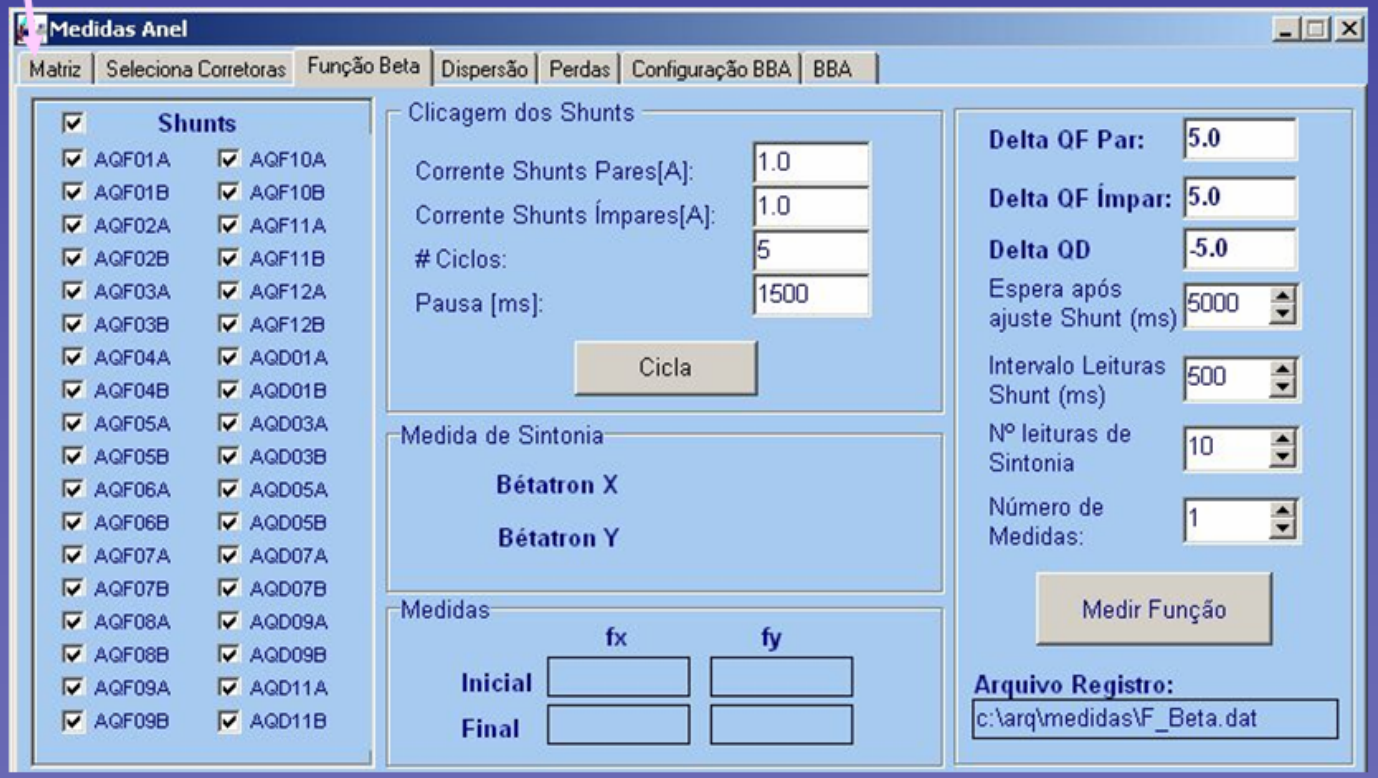

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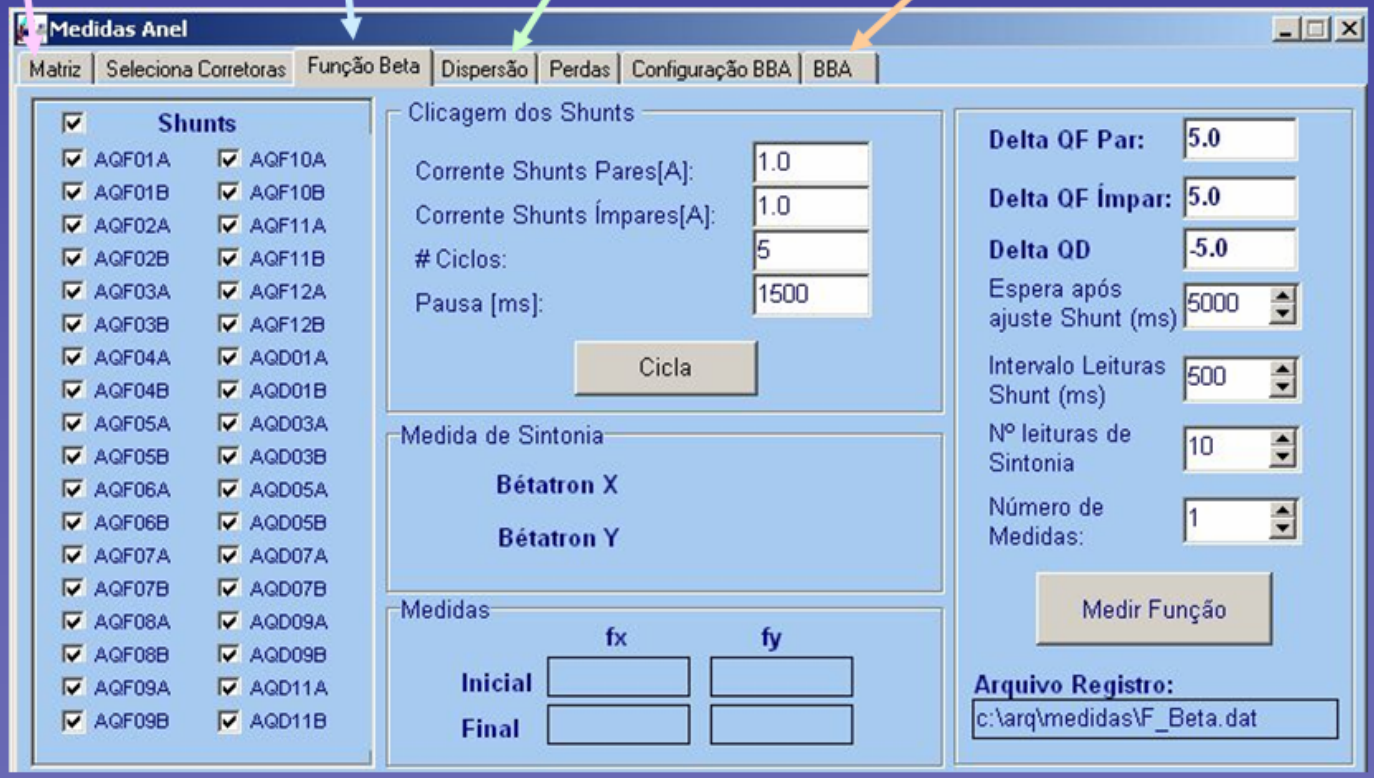
Betatron function

Dispersion function

BBA



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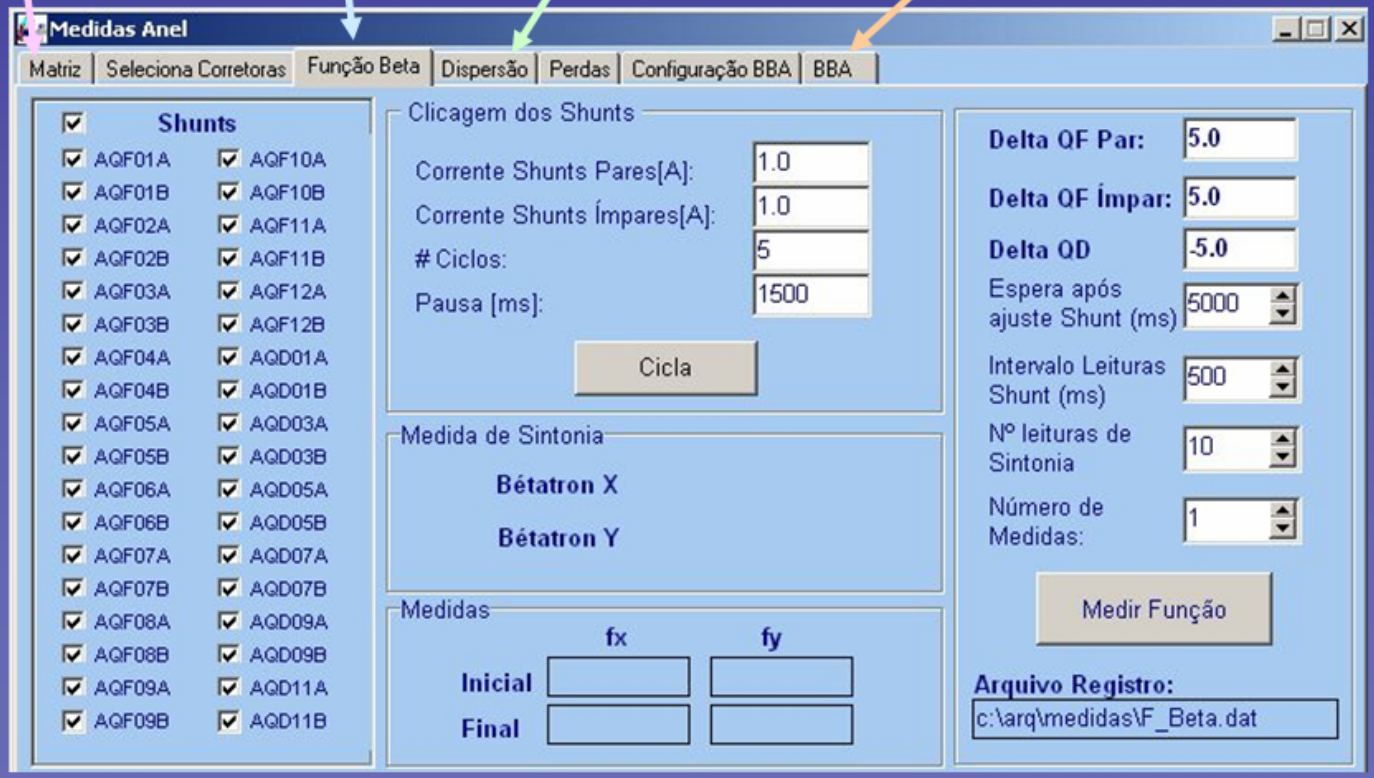

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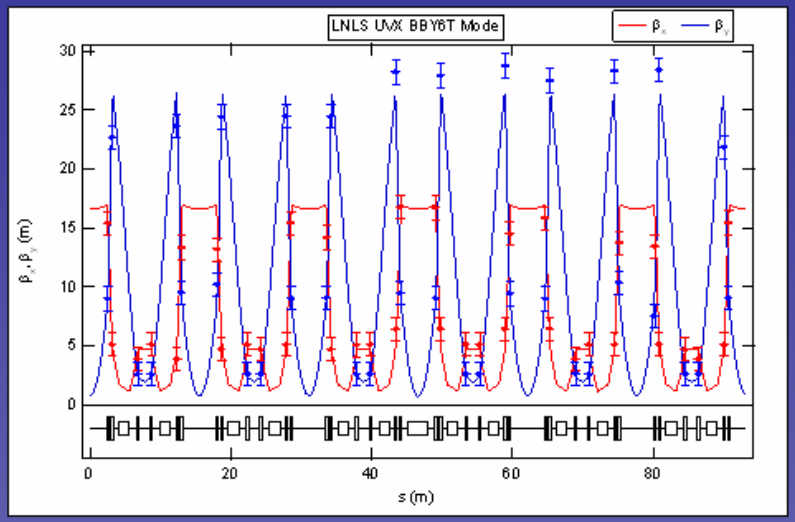
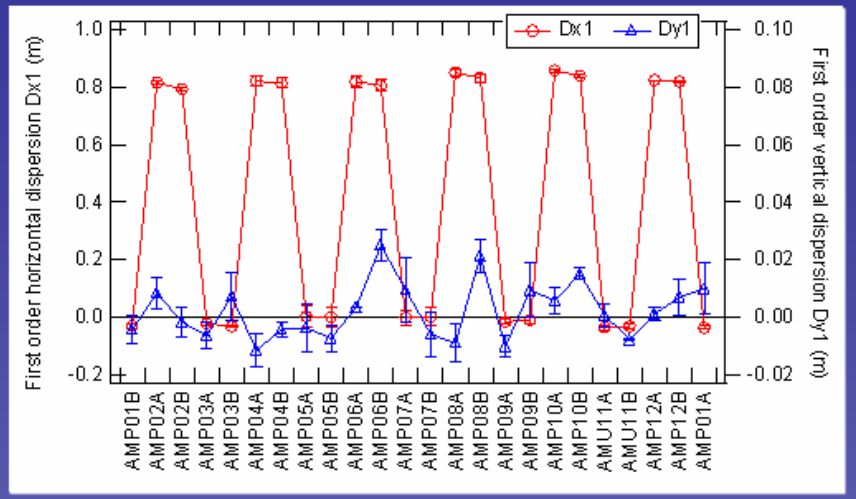
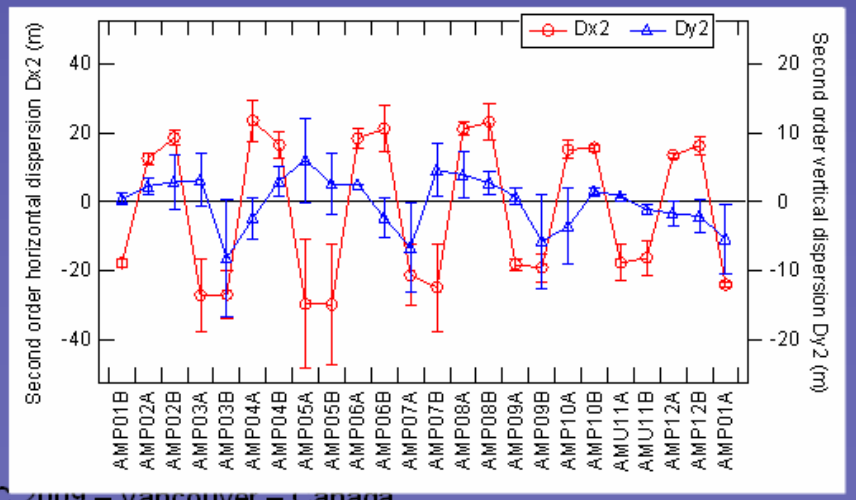


Betatron function measurement by changing quadrupole strengths after symmetrization using LOCO.
(Poster on Thursday TH6PFP012).

First order dispersion function measurement

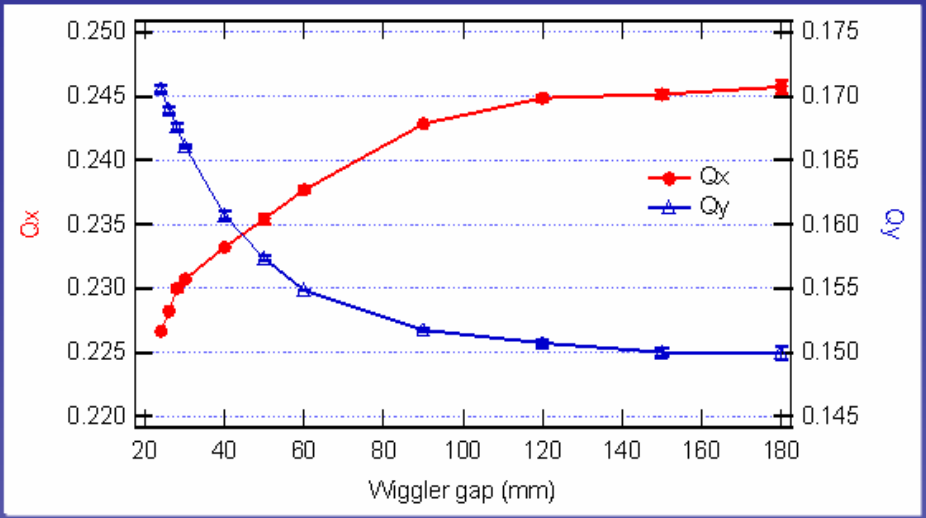


Second order dispersion



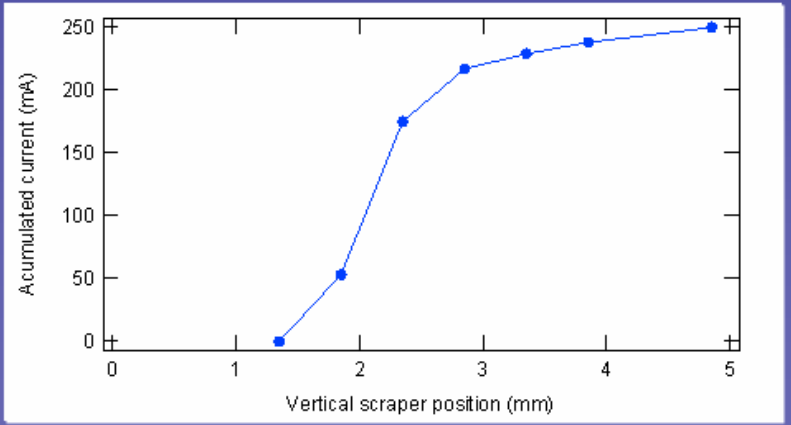
Characterization of BBY6T

Tune shift as a function of wiggler full gap.

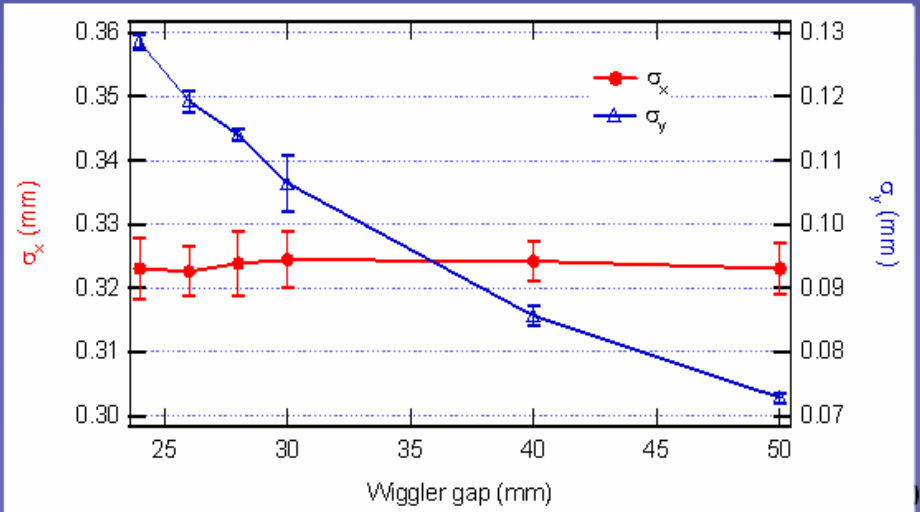


Saturation current at injection as a function of vertical scraper position.

5.0 mm @ scraper scales to
3.5 mm @ ss centre
9.7 mm @ ss extremities



Beam sizes as a function of wiggler full gap.



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Conclusions

- We have changed the nominal operation mode for the LNLS UVX storage ring after 11 years of operation.
- The new mode was successfully commissioned at the end of 2008.
- We can open and close the presently installed IDs without compensation and without losing the beam.
- BBY6T is routinelly employed for users runs since the beginning of 2009.

Thank you
for your attention !