LEAPS INNOVATION

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Workshop on Undulators Technology

WP6.2.2 || Short Period Cryogenic Permanent Magnet Undulator

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LEAPS League of European Accelerator-based Photon Sources

Key Elements of the Innovation

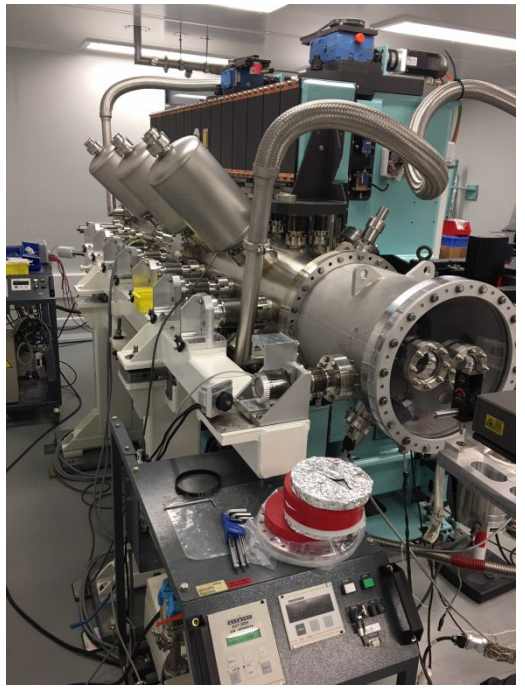
Short period Cryogenic Permanent Magnet Undulators (CPMU)

High energies, more periods than IVUs for a given length

Higher magnetic field

⇨ Production of high brightness photons at large energies

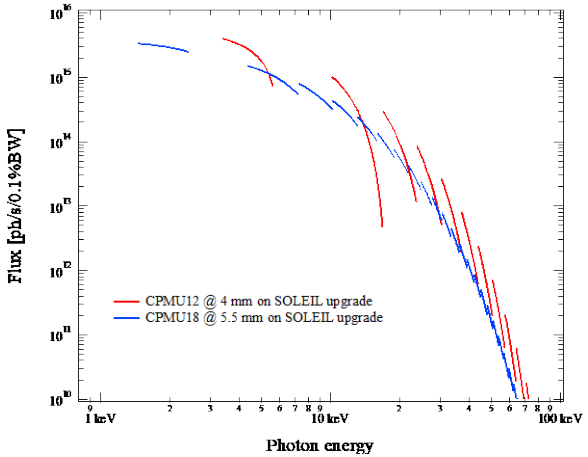
CPMU **robust approach** for high photons energy range: several devices already in operation
(SOLEIL, ESRF, DLS, PSI,…)

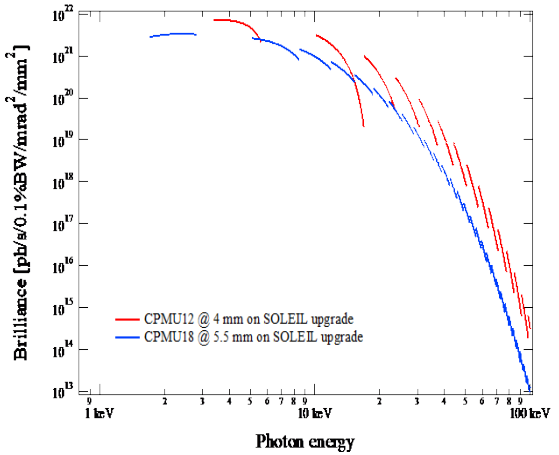


↳ **LEAPS R&D for short period system and optimized construction process**

Industrial Collaboration Opportunities

- Short period CPMU :
  - ➔ workhorses for the low emittance storage ring synchrotron radiation sources
  - ➔ compact devices for laser plasma acceleration based FEL (SACLA, COXINEL,…)
  - ➔ in near future could replace standard in-vacuum undulators
  - ➔ with a balance of the development of Superconducting Undulators



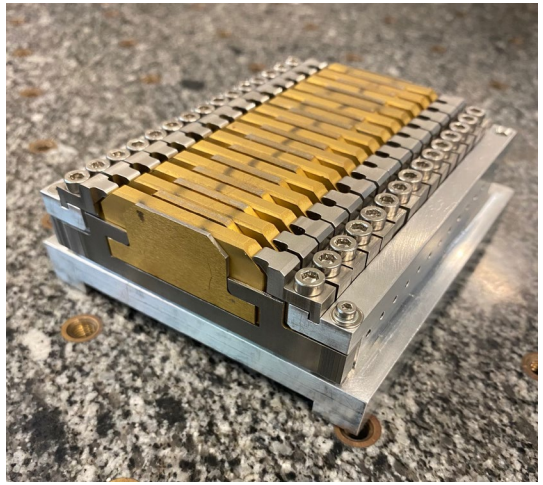


- Robotic application and correction algorithm for efficient magnetic field optimization

New mechanical design for efficient assembly and optimisation

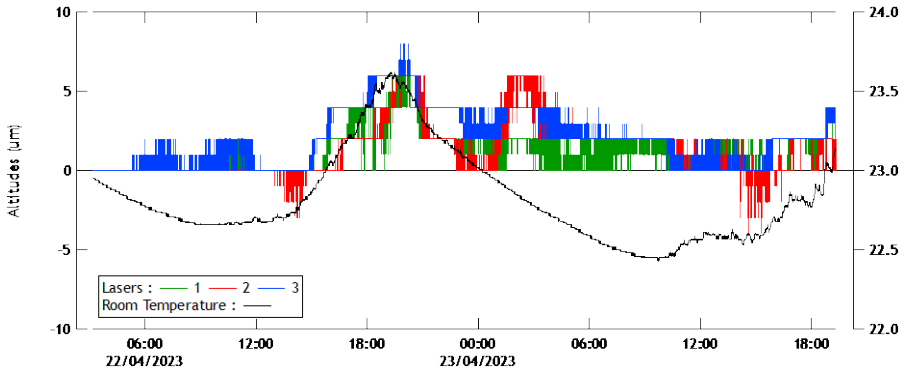
SuperModule of 8 periods

- ➔ Easy installation of the magnets
- ➔ Insertion of the poles at the end



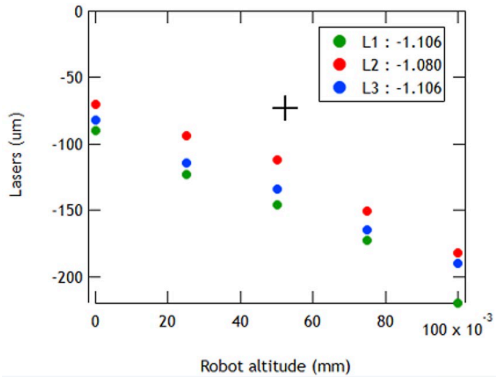
Mechanical and magnetic adjustment of the poles

- ➔ Adjustment of the poles thanks to mechancial measurements : laser sensors measuring the altitude of each pole and its adjacent magnets + screw driver
- ➔ Adjustment of the poles thanks to magnetic measurements : arm holding a 3 axis Hall probe + field analysis algo + screw driver



Stability : 5µm over 48h

High linearity



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“ Foster open innovation for accelerator-based lightsources in Europe”

https://leaps-initiative.eu

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