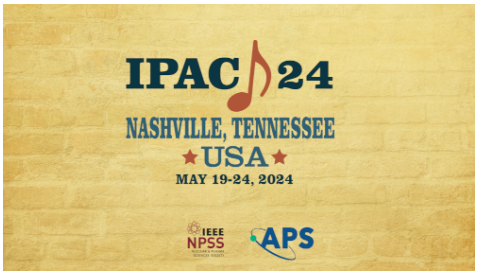

Contribution ID: **2254** Contribution code: **SUPC065** Type: **Poster Presentation**

Novel high-intensity X and Gamma-rays sources using crystals

Sunday, 19 May 2024 16:00 (2 hours)

The research is focused on finding new ways to generate high-intensity, monochromatic X and gamma-rays, surpassing the capabilities of existing methods. While Free-Electron Lasers (FEL) have limitations on photon energy, and Inverse Compton Scattering relies on powerful lasers, the search for alternatives continues. TECHNO-CLS, a PATHFINDER project funded by the European Innovation Council, is dedicated to crafting innovative gamma-ray Light Sources (LSs), utilizing linear, bent, or periodically bent crystals. Similar to magnetic undulators, crystals leverage a strong interplanar electrostatic field to prompt particle oscillation, resulting in electromagnetic radiation. By reducing the oscillation period to sub-mm dimensions, these undulators can produce tens of MeV in photon energy when exposed to GeV electron beams*. As a passive and sustainable element, CLSs show great promise. In the initial phase of the project, we identified techniques to realize CLSs, using alternated pattern deposition on silicon, using simulation to optimize the pattern and conducted experiments at CERN PS with Tungsten and Iridium crystals.

Footnotes

- A.V. Korol, A.V. Solov'yov, Novel Lights Sources Beyond Free Electron Lasers, Particle Acceleration and Detection series, Springer Nature Switzerland, Cham (2022), 214 p., ISBN: 978-3-031-04281-2

Funding Agency

European Commission (G.A. 101046458, G.A. 872196)

Paper preparation format

LaTeX

Region represented

Europe

Primary author: NEGRELLO, Riccardo (Istituto Nazionale di Fisica Nucleare)

Co-authors: SELMI, Alessia (Università dell'Insubria & INFN Milano Bicocca); Dr SYTOV, Alexei (Istituto Nazionale di Fisica Nucleare); MAZZOLARI, Andrea (Istituto Nazionale di Fisica Nucleare); DE SALVADOR, Davide (Univ. degli Studi di Padova); VALZANI, Davide (Istituto Nazionale di Fisica Nucleare); VALLAZZA, Erik (Istituto Nazionale Fisica Nucleare, Trieste); SGARBOSSA, Francesco (Univ. degli Studi di Padova); PATERNÒ, Gianfranco (Istituto Nazionale di Fisica Nucleare); LEZZANI, Giulia (Università dell'Insubria & INFN Milano Bicocca); BANDIERA, Laura (Istituto Nazionale di Fisica Nucleare); MALAGUTTI, Lorenzo (Istituto Nazionale di

Fisica Nucleare); LANZONI, Luca (Universita' degli Studi di Modena e Reggio Emilia); ROMAGNONI, Marco (Istituto Nazionale di Fisica Nucleare); SOLDANI, Mattia (Istituto Nazionale di Fisica Nucleare); PREST, Michela (Università dell'Insubria & INFN Milano Bicocca); CANALE, Nicola (Istituto Nazionale di Fisica Nucleare); MONTI-GUARNIERI, Pietro (Università dell'Insubria & INFN Milano Bicocca); CARSI, Stefano (Università dell'Insubria & INFN Milano Bicocca); GUIDI, Vincenzo (Istituto Nazionale di Fisica Nucleare)

Presenter: NEGRELLO, Riccardo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Student Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T15 Undulators and Wigglers