Contribution ID: **1022** Type: **Parallel Talk**

Crystal-based positron source for the lepton colliders

Thursday, 7 July 2022 09:00 (15 minutes)

Future studies with high-precision on fundamental interactions developed on lepton colliders require high-intensity and low-emittance positron sources. Such sources are needed for e+e- and also μ+μ- (generated with positrons) facilities. The availability of powerful positron sources is, therefore, very important. In this context, positron sources providing higher yields, better emittance and reliability than the SLC source are needed. Improvements in conventional positron sources using high-intensity incident electrons on thick metallic targets are meeting some limits due to the important energy deposited in the target with a high-energy deposition density associated to the required small beam sizes. Innovative solutions using the channeling radiation of electrons in axially aligned crystals are providing high photon yields which, in turn, can provide high positron production rate in an associated amorphous target. Such system composed by a crystal-radiator and an amorphous-converter is known as an hybrid positron source. For linear colliders, involving high incident electron intensities, a bending sweeping magnet put between the two targets to sweep off the charged particles created in the crystal, allows the mitigation of the deposited energy in the converter. For the circular e+e- colliders using more moderate intensities, the use of the sweeping magnet in the hybrid source can be omitted. Both options will be presented together with the simulations of the photon and positron production. In this framework, a study of the radiation emitted by a high-quality tungsten crystal using the DESY beamtest facility T21 will be presented and discussed.

In-person participation

Yes

Primary authors: CHAIKOVSKA, Iryna (LAL); BANDIERA, LAURA (Istituto Nazionale di Fisica Nucleare)

Co-authors: CAVOTO, Gianluca (Istituto Nazionale di Fisica Nucleare); DE SALVADOR, Davide (University of Padova and INFN Laboratori Nazionali di Legnaro); MAZZOLARI, Andrea (INFN Ferrara); SYTOV, Alexei (INFN Ferrara); BOMBEN, Luca (Dipartimento di Scienza e Alta Tecnologia, Università degli Studi dell'Insubria, Como, Italy - Istituto Nazionale di Fisica Nucleare, sezione di Milano Bicocca, Milan, Italy); CAMATTARI, Riccardo (FE); HAURYLAVETS, Viktar (Institute for Nuclear Problems, Belarusian State University); CHEHAB, Robert (IPNL/IN2P3); LUTSENKO, Evgenii (Istituto Nazionale di Fisica Nucleare); PREST, Michela (University of Insubria and INFN Milano Bicocca); VALLAZZA, Erik (Istituto Nazionale di Fisica Nucleare, sezione di Milano Bicocca, Milan, Italy); TIKHOMIROV, Viktor (Institute for Nuclear Problems, Belarusian State University); TAMISARI, Melissa (Istituto Nazionale di Fisica Nucleare); SOLDANI, Mattia (University of Ferrara and INFN Ferrara); SGARBOSSA, Francesco (University of Padova and INFN Laboratori Nazionali di Legnaro); RONCHETTI, Federico (University of Insubria and INFN Milano Bicocca); ROMAGNONI, Marco (INFN Ferrara); MASCAGNA, Valerio (University of Brescia and INFN Pavia); GUIDI, Vincenzo (University of Ferrara and INFN Ferrara)

Presenter: CHAIKOVSKA, Iryna (LAL)

Session Classification: Accelerators: Physics, Performance, and R&D for future facilities

Track Classification: Accelerators: Physics, Performance and R&D for future facilities