



Contribution ID: 1480 Contribution code: WEPL129

Type: **Poster Presentation**

New Geant4 Simulation Model of Electromagnetic Processes in Oriented Crystals and its Applications in Accelerator Physics

Wednesday, 10 May 2023 16:30 (2 hours)

Electromagnetic processes of charged particles interaction with oriented crystals provide a wide variety of innovative applications such as beam steering, crystal-based extraction/collimation of leptons and hadrons in an accelerator, a fixed-target experiment on magnetic and electric dipole moment measurement, a positron source for lepton and muon colliders, X-ray and gamma radiation source for radiotherapy and nuclear physics as well as plasma acceleration in the crystal media. One of the main challenges is to develop an up-to-date, universal and fast simulation tool to simulate these applications.

We present a new simulation model capable to simulate both steering and radiation electromagnetic processes in oriented crystals implemented into the Geant4 simulation toolkit. *We validate the model with the experimental data and benchmark it with other simulations**. We discuss the advantages and perspectives of this model for the applications of oriented crystals mentioned above.

Funding Agency

A. Sytov acknowledges the European Commission (GA. 101032975). We acknowledge MC-INFN project, the CINECA award under the IS CRA initiative and KISTI National Supercomputing Center (KSC-2022-CHA-0003).

Footnotes

- J.Allison et al., NIM A 835, 186-225 (2016). ** A. I. Sytov, V. V. Tikhomirov, and L. Bandiera, PRAB 22, 064601 (2019).

I have read and accept the Privacy Policy Statement

Yes

Primary author: SYTOV, Alexei (Istituto Nazionale di Fisica Nucleare)

Co-authors: BANDIERA, Laura (Istituto Nazionale di Fisica Nucleare); CHO, Kihyeon (Korea Institute of Science and Technology Information); CIRRONE, Giuseppe (Istituto Nazionale di Fisica Nucleare); GUATELLI, Susanna (University of Wollongong); HAURYLAVETS, Viktor (Institute for Nuclear Problems of Belarusian State University); HWANG, Soonwook (Korea Institute of Science and Technology Information); IVANCHENKO, Vladimir (CERN); PANDOLA, Luciano (Istituto Nazionale di Fisica Nucleare); ROSENFELD, Anatoly (University of Wollongong); TIKHOMIROV, Victor (Belarussian State University)

Presenter: SYTOV, Alexei (Istituto Nazionale di Fisica Nucleare)

Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D03: Calculations of EM fields
Theory and Code Developments