Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, 14.05.2024 16:00

Hybrid Seminar:

Seminar Room 30b/459 & zoom Video Access

Oriented Crystals Breaking Down the Challenges in Accelerator Physics, Particle Physics, and Space Science — and their Simulation with Geant4

Alexei Sytov*

INFN Ferrara
(Ferrara, Italy, EU)

Abstract

Oriented crystals create a unique environment for strong-field QED effects involving both high-energy charged particles and photons. This provides a wide variety of innovative applications in accelerator physics, high-energy frontier physics, nuclear physics, ultracompact detectors and gamma-ray space telescopes for dark matter search, radiation therapy and plasma wakefield acceleration in crystals and nanostructures. Their development requires an up-to-date, universal and fast simulation tool [1]. The Marie Skłodowska-Curie Actions Global Fellowships, Project TRILLION GA n. 101032975 is dedicated to the implementation of electromagnetic effects in oriented crystals and their applications implementation into Geant4 simulation toolkit [2] to bring them to a wide community as a digital instrument, including both the simulation code and Geant4 examples of various applications mentioned above. This presentation offers an overview of the project and its latest results.

∗ A. Sytov is supported by the European Commission MSCA IF TRILLION GA101032975.

[1] A. Sytov et al., *Journal of Korean Physical Society* **83**, 132-139, (2023).
[2] J. Allison et al., *Nucl. Instr. Methods Phys. Res. A* **835(1)**, 186-225 (2016).

W.Hillert, (Univ. HH), I.Agapov (MPY) and M.Vogt (MFL).