Institutul Național de Fizică și Inginerie Nucleară
Horia Hulubei

IFIN-HH

Seminar general

Channeling, Volume Reflection, gamma-ray Production and Acceleration: The Potential of Crystals for Manipulating Electron Beams of High Energy and Intensity

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Recently, a campaign to measure channeling and volume-reflection effects with multi-GeV electron and positron beams in crystals has gained momentum at SLAC. Experiments of an international SLAC-Aarhus-California State Polytechnic-Ferrara collaboration have yielded data on electron channeling as well as the volume reflection process in a little-explored energy range that challenge some of the energy-scaling relations used up to now. With a group from the U. of California at Irvine joining the collaboration an important aspect – that of the possibility of using crystals or other ordered materials as a medium for wakefield acceleration – will be explored in the coming years, besides the study of g-ray production at potentially high intensity and narrow energy bandwidth. One possible means of exciting the wakefields necessary for acceleration will be using extreme-power short-pulse X-ray laser beams which could potentially be generated at ELI-NP. At SLAC, the MEC facility at LCLS (Matter in Extreme Conditions) also has some potential to produce laser pulses of interesting intensity for such experiments.

I will report on the results of our experiment so far, discuss the wakefield acceleration parameters and also describe the MEC facility at LCLS.

Miercuri 22 aprilie 2015 ora 10^{30}
Biblioteca Națională de Fizică