



Contribution ID: 76

Type: **oral**

VOLUME REFLECTION CRYSTALLINE UNDULATOR

Tuesday, 10 September 2024 16:50 (20 minutes)

A.V. Shchagin^{1,2,*}, G. Kube¹, A.P. Potylitsyn³, S.A. Strokov¹

¹Deutsches Elektronen-Synchrotron DESY, Notkestr. 85, 22607 Hamburg, Germany

²Kharkiv Institute of Physics and Technology, Academicheskaya 1, Kharkiv 61108, Ukraine

³Institute of Applied Problems of Physics, 25, Hr. Nersisyan Str., 0014, Yerevan, Republic of Armenia

*Corresponding author, e-mail: alexander.shchagin@desy.de

Abstract

Two schemes of the crystalline undulator, based on the volume reflection effect of ultra-relativistic charged particles from bent crystallographic planes, are discussed. For the first time, analytical expressions have been derived for several key properties of the volume reflection undulator: the undulator parameter, the undulator equations, the set of emitted undulator frequencies, the angular range for the emission of undulator radiation, and the energy threshold required for the operation of such a volume reflection undulator. The influence of the density effect on the yield of the undulator radiation from a crystalline undulator and possible applications of the volume reflection undulator for transmutation of nuclear waste are discussed.

This project has received funding through the MSCA4Ukraine project ION-LOSS #1233244, which is funded by the European Union.

Primary authors: SHCHAGIN, Alexander (DESY); Dr KUBE, Gero; Prof. POTYLITSYN, Alexander; Dr STROKOV, Sergey

Presenter: SHCHAGIN, Alexander (DESY)

Session Classification: New Concepts