



Contribution ID: 169

Type: Oral

## Parametric and Characteristic X-Ray Radiation for Diagnostics of Interaction of Ultra-Relativistic Particles with Crystalline Deflectors

Monday, 6 October 2014 10:00 (15 minutes)

A.V. Shchagin  
Kharkov Institute of Physics and Technology, Kharkov, Ukraine  
Belgorod State University, Belgorod, Russia

Usually, results of interaction of relativistic particles with a crystalline deflector are observed as a variation in the angular distribution of the particles. But for recent ten, the understanding of properties of X-ray radiation of relativistic particles moving in a bent crystal has been developed. Some properties of the parametric X-ray radiation (PXR) emitted in a bent crystal were first considered in [1]. The application of the PXR for online diagnostics of the interaction of the beam with bent crystal was proposed in [2]. In [3], it was analyzed possibility to use PXR for control of the bent crystal degradation. Besides, characteristic X-ray radiation of crystal atoms were used for monitoring of number of electrons passed through crystalline target [4]. More recently, new experiments [5,6] were performed to study X-ray radiation excited by protons in crystalline and non-crystalline targets, but any manifestations of crystal curvature were not observed yet.

In present paper, we discuss different possibilities for application of parametric and characteristic X-ray radiation emitted from crystalline beam deflectors. Some peculiarities of X-rays emitted at different mechanisms of deflections, like channeling, volume reflection, and scattering on atomic rings are considered. Besides, applications of X-rays for monitoring of the beam intensity and for control of crystal alignment on a beam are discussed. The author acknowledges the partial support by the MES of RF under project 3.2009.2014/K.

### References

1. A.V. Shchagin, JETP Letters 80 (2004) 469-473.
2. A.V. Shchagin, J. Kharkiv Univ., Phys. Ser. "Nuclei, Particles Fields" 30 (2006) 35.
3. A.S. Gogolev, A.P. Potylitsyn, A.M. Taratin, Yu.S. Tropin, Nucl. Instrum. Methods B 266 (2008) 3876.
4. A.V. Shchagin, V.I. Pristupa, N.A. Khizhnyak, Phys. Lett. A148 (1990) 485-488.
5. W. Scandale et al. Phys. Lett, B701 (2011) 180-185.
6. A.G. Afonin et al., Problems of Atomic Science and Technology, Series "Plasma electronics and new methods of acceleration" №4(86) (2013) 315-319.

**Primary author:** Dr SHCHAGIN, Alexander (Kharkov Institute of Physics and Technology)

**Presenter:** Dr SHCHAGIN, Alexander (Kharkov Institute of Physics and Technology)

**Session Classification:** S1: Channeling & Radiations in Crystals