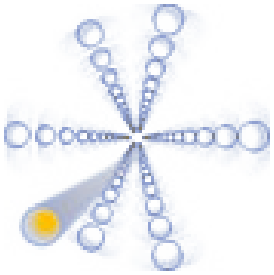

Contribution ID: **169** Type: **Oral**

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)

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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 bee 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.

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Session Classification: S1: Channeling & Radiations in Crystals