Contribution ID: **91** Type: **Poster**

Quantum effects for particles channeling in a bent crystal

Monday, 26 September 2016 18:40 (1 hour)

Quantum mechanical theory for channeling of relativistic charged particles in the bent crystals is considered. Quantum effects of underbarrier tunneling are essential when the radius of the crystal channel curvature is close to its critical value. In this case the wave functions of the quasi-stationary states corresponding to the particles captured in a channel can be presented in the analytical form. The efficiency of channeling of the particles and their angular distribution at the exit crystal surface are calculated. Characteristic experimental parameters for observation of the quantum effects are estimated.

It is shown that thin structure of angular distribution in the deflected beam should appear in the framework of the quantum-mechanical effects for the particles channeled by the bent crystal. Its characteristic form depends on the number of a particle localized states in the average potential of the planes. Experimental investigation of this phenomenon may demonstrate the quantum-size effects for high energy physics and may be useful for optimization of bent crystal parameters. In case, when a crystal curvature radius is near critical one, the quantum tunneling of the captured particles should be taken into account together with the classical de-channeling processes.

Primary author: Prof. FERANCHUK, Ilya (Belarusian State University)

Co-authors: Prof. LOBKO, Alexander (Institute for Nuclear Problems, Belarusian State University); Mr QUANG SAN, Nguyen (Belarusian State University)

Presenter: Prof. LOBKO, Alexander (Institute for Nuclear Problems, Belarusian State University)

Session Classification: PS1: Poster Session