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STIMULATED RESONANCE RADIATION OF CHANNELING PARTICLES

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Stimulated Resonance Radiation of Channeling Particles
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Abstract. The motion of channeling particles in the accompanying coordinate system can be considered as an one-dimensional oscillator (in the case of planar channeling), or as a two-dimensional atom (in the case of axial channeling [1]). The transversal motion of the channeling particle is characterized by discrete spectrum. The occupation probability of transversal motion levels depends on the entrance angle of charged particle relative to the crystallographic axis [2-4]. Passing through the crystal charged channeling particle undergoes periodic action of the lattice atoms [5-7] with basic frequency $\omega = \gamma v/d$, where d is the lattice constant, v and γ are the velocity and the Lorentz factor of the channeling particles [6]. If the frequency of an external periodic interference coincides with the frequency of the transition of the moving channeling particles from one quantized state of transversal motion in another, the resonant excitation of the channeling particles is possible, i.e. similar to the excitation of atomic electrons by the periodic field of monochromatic electromagnetic waves [8-9]. In the report the resonance conditions are discussed and the induced resonance radiation spectrum of channeled particles is analyzed.

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