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Quantum Jumps in PXRC Angular Distributions from Relativistic Channeled Electrons and Positrons in a Crystal

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The difference in angular distributions of the standard Parametric X-Radiation (PXR) from plane-wave electrons (without channeling) and Parametric X-Radiation from channeled electrons (PXRC) is connected with manifestation of two quantum effects: formfactors of transverse quantum channeling states and their initial populations. In the present work we showed that this difference has non-trivial dependence on the electron beam energy: it undergoes some quantum jumps with appearance of the new quantum channeling state following increase of the electron beam energy. The magnitude of the jump depends on the form-factor and initial population of next quantum state.

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