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PS1-19: Influence of the Divergence of Ultrarelativistic Electron Beam on Spectral-Angular Characteristics of Coherent X-Radiation Generated by it in a Single-Crystal Target

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The dynamical theory of coherent X-ray radiation generated in a single-crystal target by the beam of relativistic electrons with a finite divergence is developed in the scattering geometry Laue. Coherent X-ray emission is considered in the general case of asymmetric reflection of the Coulomb field of the electron in the form of two emission mechanisms contributions: of the parametric X-ray radiation (PXR) and diffracted transition radiation (DPI). The averaging method of the radiation cross section by the angular distribution of electrons in the beam is used. The influence of the electron beam divergence on the spectral and angular characteristics of coherent radiation is studied. The dramatic difference of the effects of electron beam divergence in PXR and DPI is shown. The possibilities of practical use of DPI from single-crystal target for indication of beam divergence of the ultrarelativistic electrons are investigated.

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