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Influence of multiple scattering of relativistic electron on coherent x-ray radiation by electron beam in a single crystal

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Coherent X-ray radiation by a beam of relativistic electrons crossing a single-crystal plate in Bragg scattering geometry have been considered. Initial divergence and multiple scattering of electrons on atoms are taking into account in the present work. In the present work, the initial divergence and multiple scattering of electrons on atoms in the target have been taken into account. The expressions describing spectral-angular characteristic of PXR and DTR have been derived based on the two-wave approximation of diffraction theory taking into account the deviation of electron velocity vector from the electron beam axis direction. The traditional method of cross section averaging over expanding beam of straight electron trajectories are used to account multiple scattering. In the work, the significance (insignificance) conditions of diffracted bremsstrahlung contribution to total yield of the radiation has been estimated. The possibility of dynamic effects manifestation in PXR in the conditions of the electron multiple scattering are shown. The influence of initial divergence of electron beam on the effects of dynamical diffraction manifestation have been investigated.
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