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PS1-20: Influence of Real Photon Diffraction on Parametric X-Ray Radiation Angular Distribution in thin Perfect Crystals

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Influence of real photon diffraction on parametric X-ray radiation angular distribution in thin perfect crystals

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Recently it has been suggested to use parametric X-ray radiation (PXR) angular distribution of fast particles in thin crystals for determination of modern accelerators electron beam parameters [1,2]. It is well known, see e. g., [3], that PXR of fast electrons in crystals always is accompanied by diffracted real photons of transition radiation (DTR) and bremsstrahlung (DB). Contribution of these types of emission changes the PXR angular distribution. For description of diffracted real photons contribution into the total emission angular distribution on the base the work [4] approach it is suggested and realized a simple method of simulation of the diffracted real photons yield of bremsstrahlung and transition radiation from perfect crystals of arbitrary thickness up to some primary extinction lengths.
It is shown that for small thickness of crystals and observation angles concerning the center of the reflex, contribution of diffraction of real photon is comparable with the yield of parametric X-radiation and determines the shape of total emission angular distribution there. Influence of electron beam size and divergence on total emission angular distribution is analyzed. Dependence of PXR and DTR relative contribution from the electron energy, an observation angle and reflection order is discussed from the point of view of the above mentioned method sensitivity.

References
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