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Parametric X-ray Radiation in Crystals with Locally Disturbed Characteristics

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Electron moving through a crystal target can affect the crystal cell by its Coulomb field. Within the first approximation, it leads to arising parametric X-ray radiation (PXR). In the case of consequent short and intense bunches the witness-bunches come to the crystal cells disturbed by the driver-bunches. It can cause the change in the radiation characteristics. To date, such short and extremely intense beams are available in modern FELs. In this work we consider the influence of electron wake-field on the electrons of a target. We obtain the electron densities in crystal after the electron passage and calculate the locally disturbed dielectric properties. So, the dielectric constant of the crystal changes locally, and, as a result, the intensity of PXR changes as well. We compare the spectral-angular density of PXR from conventional, undisturbed crystal with that from a one locally disturbed by intense electron beam.

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