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Polarization Characteristics of the Grating Diffraction Radiation

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The Grating Diffraction Radiation (GDR) mechanism can provide monochromatic beams in THz and sub-THz ranges with a possibility of the spectral line tuning [1]. Additional advantage of this mechanism is connected with its flexible polarization characteristics. In contrast with THz beams generated via the transition radiation (TR) mechanism [2], where polarization is radial, for the GDR case (as well as for the conventional diffraction radiation [3]) emitted photon's polarization state may be chosen from pure linear to elliptical one by variation of experimental geometry. We have carried out investigations of the GDR polarization characteristics both experimentally and theoretically. Measurements were performed with 8 MeV electron beam and 4 mm period triangular profile grating. Simulations were conducted using the generalized surface current method for experimental conditions (real grating profile, finite size grating, near field and coherent effects, etc.). We confirmed a possibility to generate circularly polarized beams. Further investigations are foreseen to explore applicability of polarization selection for the high diffraction orders of emitted radiation.

Summary

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