

Characteristics of Smith-Purcell Radiation and Grating Transition Radiation from Gratings with Variable Profile

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In the report we compare the characteristics of the coherent Smith-Purcell radiation (SPR) and the grating transition radiation (GTR) [1] in the millimeter wavelength range generated by the 6 MeV electron beam from Tomsk microtron. The experiment was performed with the modulated electron beam with RF frequency $\gamma_0 = 2.63$ GHz. The measurements were carried out for two types of gratings, the first one was designed with flat strips separated by vacuum gaps with variable angles of the strip inclination, and the second one was a standard grating with a triangular profile. A sharp spectral and angular discreteness of GTR and SPR were detected. These effects are determined by the resonances between modulated beam periodicity and diffraction orders of the radiation from gratings. We demonstrate a strong dependence of the radiation intensity on the grating strip slope and its profile.

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References

- [1] G.Naumenko, A.Aryshev, A.Potylitsyn et al. NIM B **402** (2017) 153-156.

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