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Monochromatic Coherent Grating Transition Radiation of a Relativistic Electron Bunch Train

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In Ref. [1,2] authors observed the monochromatic lines in the spectrum of the coherent transition and diffraction radiation generated by modulated electron beam with the frequency of the accelerating RF field and corresponding to the resonances for .

In this report we present the results of coherent grating transition radiation (CGTR) and spectra measurements within the frequency range of 8 to 35 GHz when modulated electron beam hits the periodic target with inclined flat strips with vacuum gap between them. The monochromatic lines corresponding to the dispersion relations at the resonances were observed in the CGTR spectrum. For spectra measurements we used the Martin-Puplett interferometer with spectral resolution 800 MHz (FWMH).

One of the main goals of this research is to prove the shadowing effect (see Ref.'s [3,4]) existence for such gratings. The spectra and orientation dependences (intensity dependence from grating tilt angle θ) were simulated for two gratings taking into account experimental conditions for two cases with shadowing effect and without. The discussion of the experimental results and comparison with the calculations has been done.

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References

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