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PS1-12: Coherent Diffraction and Cherenkov Radiation of Relativistic Electrons from a Dielectric Target in the Millimeter Wavelength Range

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The diffraction and Cherenkov radiation have been observed in the millimeter wavelength range from 8 to 30 mm emitted by bunched electron beams of 6.1 MeV passing near a Teflon target. The radiation intensity at wavelength mm is enhanced by a factor in comparison incoherent radiation, the value of this factor equal to the number of electrons in the bunch. Properties of the radiations have been experimentally investigated in far-field zone. The angular distributions of the observed radiation at various angles of rotation target show an interference of diffraction radiation and Cherenkov radiation in total yield. The simple geometry of experiment is useful for a test of different theoretical models of diffraction and Cherenkov radiation in dielectric targets. The comparison of experimental results with the model of polarization currents is done.

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