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Experimental Demonstration of Unexpected Behavior of Angular Cherenkov Radiation Distribution

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The report is devoted to the discussion of the nature of Vavilov-Cherenkov effect. This radiation in transparent medium becomes observable under the condition when the phase velocity of its propagating turns out to be less than the velocity of the initial charged particle. The geometry of Vavilov-Cherenkov radiation driven by an electron bunch traveling obliquely in a vicinity of a prismatic dielectric target is very interesting from the pseudo-photon point of view. Unexpected experimental results show that Vavilov-Cherenkov criterion is the special case, which corresponds to the parallel passing of electron beam near the dielectric target. The experimental observation of Vavilov-Cherenkov radiation was performed in the millimeter wavelength range using extracted bunched 6,1 MeV electron beam of the microtron at Tomsk Polytechnic University. The obtained results may be useful for research and developed of new compact radiation source in a sub-mm and THz region.

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