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Observation of Coherent Cherenkov and Transition Radiation at the AREAL Accelerator

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The results of an experimental study of the spectral angular distribution of coherent transition and Cherenkov radiation in the sub-terahertz frequency range are presented. As targets, a thin silicon plate with an aluminium coating and a cylindrical Teflon resonator were used. The AREAL linear accelerator, with an energy of 3.6 MeV and located at the CANDLE Synchrotron Research Institute in Yerevan, served as the electron source. Radiation was recorded using SBD (Schottky Barrier Diode) detectors, designed for frequencies ranging from 33.5 to 50 GHz, 60 to 90 GHz, and 90 to 140 GHz. The obtained results were compared with previous experimental data and theoretical estimates. THz and sub-THz radiation generated by ultra relativistic charged particles can be used for development of intense sources of photons as well as for particle beam diagnostics. The work was partially supported by the Science Committee of RA, in the frames of the research project № 21AG-1C069.

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