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Measurements of coherent transition radiation at the AREAL accelerator

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The article presents the results of a study of the mechanisms of coherent transient radiation (CTR) in the sub-terahertz frequency range. This type of radiation can be used to diagnose short electron bunches and can serve as a basis for the development of radiation sources in the THz and sub-THz range. The AREAL linear accelerator with an energy of 3.6 MeV, located at the CANDLE Synchrotron Research Institute in Yerevan, was used as an electron source in the study.

Using an interferometer designed according to the Martin-Applet scheme [1], frequency spectra of radiation were obtained. This made it possible to estimate the length of the electron beam. The radiation was recorded using ZBD-F detectors designed for frequencies in the range from 33.5 to 50 GHz, from 60 to 90 GHz and from 90 to 140 GHz[2].

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[1] D.H. Martin; E. Puplett. (1970). Polarised interferometric spectrometry for the millimetre and submillimetre spectrum. , 10(2), 105–109. doi:10.1016/0020-0891(70)90006-0

[2] Virginia Diodes Ltd. https://vadiodes.com/en/zbd

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