

## Measurements of coherent transition radiation at the AREAL accelerator

Monday 28 October 2024 18:50 (20 minutes)

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].

This work was partially financially supported by a Program of the Ministry of Education and Science of the Russian Federation for higher education establishments, project No. FZWG-2020-0032 (2019–1569).

References:

[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>

**Primary authors:** KUBANKIN, Alexander (Belgorod National Research University, Belgorod, Russia); POTYLITSYN, Alexander (Tomsk Polytechnic University, Tomsk, Russia); VUKOLOV, Artyom (Tomsk Polytechnic University, Tomsk, Russia); GRIGORYAN, Bagrat (CANDLE Synchrotron Research Institute, Yerevan, Armenia); KIDANOVA, Ekaterina (Belgorod State National Research University, P.N. Lebedev Physical Institute of the Russian Academy of Sciences); DAVTYAN, Hakop (CANDLE Synchrotron Research Institute, Yerevan, Armenia); KISHIN, Ivan (Belgorod National Research University, P.N. Lebedev Physical Institute of the Russian Academy of Sciences); GRIGORYAN, Levon (Institute of Applied Problems of Physics, Yerevan, Armenia); SHEVELEV, Michael (Tomsk Polytechnic University, Tomsk, Russia); KARATAEV, Pavel (John Adams Institute at Royal Holloway, University of London, Egham, Surrey, United Kingdom); KOCHARYAN, Vahan (Institute of Applied Problems of Physics NAS RA, Yerevan, Armenia); MARGARYAN, Vardan (Institute of Applied Problems of Physics NAS RA, Yerevan, Armenia); CHEREPENNIKOV, Yuri (Institute of Applied Problems of Physics, Yerevan, Armenia)

**Presenter:** KIDANOVA, Ekaterina (Belgorod State National Research University, P.N. Lebedev Physical Institute of the Russian Academy of Sciences)

**Session Classification:** Poster session & Welcome drinks

**Track Classification:** Particle Accelerators and Nuclear Reactors