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Coherent radiation of relativistic electrons in a wire metamaterial

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We present in this work the experimental investigation of the interaction of relativistic electron field with wire metamaterial. The measurements of the spectral-angular characteristics of coherent radiation were done in millimeter wavelength region (10-40 mm) in far-field zone on relativistic electron beam with energy of 6.2 MeV. Used target represent the right triangular prism that consist of periodic placed copper wires. We showed that bunched electron beam passing near wire metamaterial prism generates coherent Cherenkov radiation. Spectral-angular characteristics of radiation from the wire target were compared with the characteristics of Cherenkov radiation generated in similar experimental conditions in a dielectric target (Teflon prism) that has the same form and sizes.

Primary author: Ms SOBOLEVA, Veronika (Tomsk Polytechnic University)

Co-authors: VITOLD, Bleko (National Research Tomsk Polytechnic University); NAUMENKO, Gennady

Presenter: Ms SOBOLEVA, Veronika (Tomsk Polytechnic University)

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