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# Experimental Investigation of Coherent Cherenkov Diffraction Radiation in Super-radiant Regime

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Recent years have witnessed an intense investigations of Cherenkov diffraction radiation (ChDR) appearing when a fast charged particle moves in the vicinity of and parallel to a dielectric interface. This is a member of polarization radiation family, because the radiation arises as a result of dynamic polarization of a medium. The ChDR properties are sensitive to various beam parameters including beam size, position, direction, beam energy, and bunch length. Coherent ChDR is generated in the wavelength range longer than or comparable to the longitudinal size of the bunch. In this case all electrons emit radiation more or less in phase stimulating each other's emission. The radiation intensity is proportional to a square of bunch charge resulting in an enormous increase in the number of photons.

In this report we shall demonstrate generation of intense ultra-monochromatic ChDR radiation in mm-wavelength range at MT-25 microtron in Dubna. The experimental results and analysis will be presented. The influence of the longitudinal beam parameters on the radiation monochromaticity and spectral shape will be presented.

**Primary authors:** KUBANKIN, Alexander (Belgorod National Research University); BALDIN, Anton (Joint Institute for Nuclear Research); KLENIN, Artemiy (Belgorod State National Research University, 85 Pobedy str., Belgorod 308015, Russia); KIDANOVA, Ekaterina (Belgorod State National Research University, 85 Pobedy str., Belgorod 308015, Russia); BUSHMINA, Elizaveta (Joint Institute for Nuclear Research); KISHIN, Ivan (Belgorod State National Research University, 85 Pobedy str., Belgorod 308015, Russia); NOZDRIN, Mikhail (Joint Institute for Nuclear Research); KARATAEV, Pavel (Royal Holloway, Unviersity of London); STUCHEBROV, Sergei (Tomsk Polytechnic University); ALEXEEV, Sergey (Joint Institute for Nuclear Research); KOCHARYAN, Vahan (Institute of Applied Problems of Physics of NAS RA, 0014, Hr. Nersisyan str. 25, Yerevan, Armenia.); MARGARYAN, Vardan (Institute of Applied Problems of Physics of NAS RA, 0014, Hr. Nersisyan str. 25, Yerevan, Armenia); BLEKO, Vitold (National Research Tomsk Polytechnic University)

**Presenter:** KARATAEV, Pavel (Royal Holloway, Unviersity of London)

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