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Bunch length measurement based on Cherenkov radiation spectrum at PolFEL and Solaris

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The PolFEL THz free electron laser project comprises 80 MeV cw-linac furnished with warm S-band electron gun and 2 Rossendorf-like cryomodules. Besides bringing the beam to undulator, inverse Compton scattering interaction point, and finally to the dump, the beam diagnostics system is dedicated to metallic superconducting photocathodes development, in particular gun performance characterization. Bunch length will be measured in the injector section, behind the bunch compressor, and in each linac branch, behind the Wakefield linearizer at the undulator entrance. The bunch length is evaluated from sub-THz coherent Cherenkov radiation spectral distribution. Radiation emitted from a punched radiator will be analyzed with Martin–Puplett interferometer and measured with a broadband detector, both located on the breadboard at linac. A prototype will be preliminary measured with laboratory sub-THz source at IOE-MUT and subsequently at the Solaris linac with 0.5 GeV electrons.

Footnotes

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