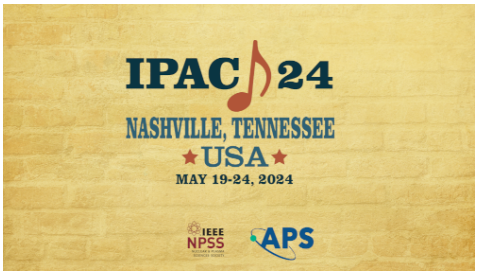

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Near-Infrared noise in intense electron beams

Sunday, 19 May 2024 14:00 (4 hours)

Requirements for the noise in electron beams (NEB) have recently approached the Shot-noise level in some new applications. The density fluctuations of intense beams in the near-infrared (NIR) region are being measured at the Fermilab Accelerator Science and Technology (FAST) facility. The main goal of the experiment is to accurately compare the Shot-noise model with the observations of optical transition radiation (OTR) generated by the gamma=63 electron beam transiting an Al metal surface. In addition, evidence for longitudinal-space-charge-induced microbunching for the chicane-compressed beam was obtained with coherent enhancements up to 100 in the various bandwidth-filtered NIR OTR photodiode signals. With micropulse charges up to 1 nC, the beam parameters are close to those proposed for a stage in an Electron-Ion Collider (EIC) with coherent electron cooling (CEC). In this paper we present the current progress of the NEB project and compare the low electron energy measurements with ImpactX simulations.

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