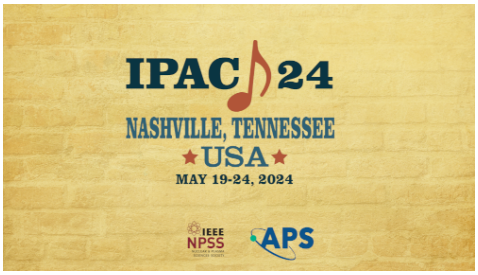

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Higher order mode detection as a beam offset monitor for LCLS-II

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LCLS-II commissioning is well under way. As an indirect diagnostic, electron beam-induced higher order mode (HOM) signals from the RF cavities in the first LCLS-II cryomodule are routed outside the accelerator and filtered to select dipole modes. The signals are amplified and detected using a Schottky diode, following a design tested at Fermilab. The detected signal magnitude is proportional to the bunch charge and the transverse offset magnitude of the electron beam in the cavity. This hardware was initially tested at the Fermilab Accelerator Science and Technology (FAST) facility, and has been adapted to LCLS-II. In this paper, we describe commissioning tests of the system in LCLS-II at SLAC. This includes a description of the associated hardware, and the code under development for live monitoring and beam offset display, as well as the calibration of the signal magnitudes using magnet and beam position monitor data.

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