

Abstract Submitted
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A high-resolution, low-latency, bunch-by-bunch feedback system for nano-beam stabilization REBECCA RAMJAWAN, PHILIP BURROWS, University of Oxford, R. RAMJAWAN, D.R. BETT, T. BROMWICH, P. N. BURROWS, C. PERRY, John Adams Institute for Accelerator Science, University of Oxford, Oxford, UK, N. BLASKOVIC KRALJEVIC, CERN, Geneva, Switzerland, G. B. CHRISTIAN, Diamond Light Source, Didcot, UK — A low-latency, bunch-by-bunch feedback system employing high-resolution cavity Beam Position Monitors (BPMs) has been developed and tested at the Accelerator Test Facility (ATF2) at the High Energy Accelerator Research Organization (KEK), Japan. The feedback system was designed to demonstrate nanometer-level vertical stabilization at the focal point of the ATF2 and can be operated using either a single BPM to provide local beam stabilization, or by using two BPMs to stabilize the beam at an intermediate location. The feedback correction is implemented using a stripline kicker and the feedback calculations are performed on a digital board constructed around a Field Programmable Gate Array (FPGA). The feedback performance was tested with trains of two bunches, separated by 280 ns, at a charge of ~ 1 nC, where the vertical offset of the first bunch was measured and used to calculate the correction to be applied to the second bunch. The BPMs have been demonstrated to achieve an operational resolution of ~ 20 nm. With the application of single-BPM and two-BPM feedback, beam stabilization of below 50 nm and 41 nm respectively has been achieved with a latency of 232 ns.

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