

Integration of a novel BPM system within the global orbit feedback environment of Elettra

Wednesday 18 April 2018 15:30 (25 minutes)

A new-concept BPM was developed to prove the usefulness of pilot tone technique in channels equalization, thermal drift compensation and self-calibration.

It ran successfully not only during various machine shifts, but also during a user dedicated beamtime shift for more than 10 hours, behaving in a transparent way for all the control systems and users. The equivalent RMS noise (10 kHz data rate) for the pilot tone position was less than 200 nm on a 20 mm vacuum chamber radius. Two main steps led to this important result: firstly, the development of a novel RF front end that adds the pilot tone to the signals originated by the beam, secondly, the realisation of an FPGA-based double digital receiver that demodulates both beam and pilot amplitudes, calculating the compensated X and Y positions.

We successfully tested our system as a drop-in substitute for Libera Electron systems, by placing our front end inside the machine tunnel, connected on one side to the button BPMs of a section normally used by a Libera, and on the other side to the digital receiver. We also demonstrated seamless communication via Ethernet interface with the global orbit feedback and Tango control systems.

Authors: Dr BRAJNIK, Gabriele (Elettra - Sincrotrone Trieste); DE MONTE, Raffaele (Elettra - Sincrotrone Trieste)

Co-authors: BASSANESE, Silvano (Elettra - Sincrotrone Trieste); CAUTERO, Giuseppe (Elettra - Sincrotrone Trieste); CLEVA, Stefano (Elettra - Sincrotrone Trieste)

Presenters: Dr BRAJNIK, Gabriele (Elettra - Sincrotrone Trieste); DE MONTE, Raffaele (Elettra - Sincrotrone Trieste)

Session Classification: DEELS