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First results with a Base Band Tune (BBQ) measurement system at Solaris

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All CERN circular accelerators are equipped with Base Band Tune (BBQ) measurement systems, based on the direct diode detection technique, allowing measuring tunes of hadron beams with their residual betatron oscillations or very small explicit excitation. In the framework of the Future Circular Collider (FCC) project, a study was launched to optimise such a system for operation with short electron bunches. A prototype system has been recently installed in Solaris light source. The system has immediately allowed an unprecedented detection of residual beam betatron oscillations, whose amplitudes are more than two orders of magnitude lower than the smallest beam oscillations used for tune measurements with the Beam Position Monitoring (BPM) system. The residual oscillations allowed reliable continuous tune measurements, which have also revealed spectral content never observed before. This paper provides an overview of the installed BBQ system and describes beam measurement results obtained so far. The aim of the paper is to disseminate new results in the light source community and provide information that may help in building and installing similar systems. It is hoped that wider usage of BBQ systems will help in better understanding the observed spectra of electron beam residual oscillations.

Footnotes

Funding Agency

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Yes

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