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Transient beam loading studies in view of the Elettra 2.0 upgrade project

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An upgrade project is ongoing at Elettra Sincrotrone Trieste for a 4th-generation storage ring light source called Elettra 2.0. The new machine poses new challenges in terms of performance of the accelerator and sub-systems. One concern, currently under investigation, is about the effects of the passive superconducting third harmonic cavity on the stored beam due to the presence of a dark gap in the beam filling pattern. A simulator based on an analytical frequency-domain model was developed to evaluate the variation of the synchronous phase and synchrotron frequency along the bunch train, as well as the distortion of the bunch profile. Experiments have been carried out in the present Elettra storage ring to characterize the harmonic cavity and to measure the effect of transient beam loading by using the longitudinal multi-bunch feedback system. An ongoing benchmarking of the model and experimental results is reported.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

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