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Study of single bunch effect in PETRA-IV storage ring

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The H6BA lattice is now considered as the baseline design for PETRA-IV light source. It is required that the ring can be operated with and without damping wigglers, resulting in two sets of natural equilibrium beam parameters. This paper analyzes the single-bunch effects due to impedance in the H6BA lattice of PETRA-IV. We will show the influence of the impedance on the electron beam in both scenarios, with and without DWs. With the help of a 3rd harmonic cavity and a high chromaticity of 6 units, the single bunch current threshold exceeds 2 mA, leaving a 100% safety margin. At the nominal coupling of 0.1, the Touschek lifetime is larger than 10 hours in all operational scenarios.

Footnotes

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