MATTER AND TECHNOLOGIES

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Assessment of the Intra-Beam Scattering and Touschek Lifetime in BESSY III

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The 4th generation synchrotron light source, BESSY III, is expected to enable high-impact applications for users in life science, material science, solar cell technology, and more.
Currently in its Conceptual Design Report (CDR) phase, the feasibility of BESSY III's ambitious parameter range necessitates a thorough assessment of "collective effects". These effects are phenomena that can either compromise beam stability or degrade beam quality, potentially hindering the expected performance.
In this work, we present recent computations of the Intra Beam Scattering (IBS) and Touschek lifetime for the BESSY III lattice. The IBS leads to a significant increase of the final emittance of the light source, while the Touschek effect critically affects the beam lifetime. We discuss the computational methods employed, the strategies for mitigating these effects, the expected performance outcomes, and the specific challenges associated with ultralow emittance storage rings.

Speed talk:

Normal speed talk selection

Primary author: JOLY, Sébastien (HZB)

Co-authors: GOSLAWSKI, Paul (Helmholtz-Zentrum Berlin, HZB); OLSSON, Teresia (Helmholtz-Zentrum Berlin)

Presenter: JOLY, Sébastien (HZB)

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