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Collimation for SOLEIL II

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The storage ring of the SOLEIL II project will be based on a low-emittance multi-bend achromat 7BA-4BA lattice resulting in very compact lattice (1500 magnets for a 354 m long ring), very high quadrupole gradient (120 T/m), strong sextupole (8000 T/m²), and moderate octupole (50 000 T/m³) with a beam circulating in a tiny vacuum chamber of 12 mm diameter. The project makes extensive use of permanent magnets (dipole, reverse bend, and all quadrupole magnets). This paper presents the main challenges of collimating the high electron density of the storage ring beam. The absence of “Loss Stay Clear” makes the loss profile to be fully distributed along the storage ring: the aperture itself acts as a global collimator with very short-ranged losses (80% during the first turns, majority of losses in the 7BA arcs). The absence of dispersion in the straight sections leads to strong difficulties in finding an efficient collimation scheme for Touschek scattered particles. The collimation scheme, lattice modification options, radiation damage, and radiation safety aspects are also discussed.

Footnotes

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Europe

Primary author: NADOLSKI, Laurent (Synchrotron Soleil)

Co-author: DALENA, Barbara (Commissariat à l’Energie Atomique et aux Energies Alternatives)

Presenter: NADOLSKI, Laurent (Synchrotron Soleil)

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