



Contribution ID: 1499 Contribution code: WEPL176

Type: **Poster Presentation**

Resistive-wall instability evaluation along the ramp in the SOLEIL II booster

Wednesday, 10 May 2023 16:30 (2 hours)

The ultra-low emittance specification of the SOLEIL II storage ring requires a challenging lattice design of the booster that will inject the beam into it. The dimension of the vacuum chamber in the new booster must be reduced compared to that in the present machine. The resistive-wall (RW) instability is then expected to become more important than in the current booster. However, the Amplitude-Dependent Tune Shift (ADTS) is also expected to be stronger due to the strong sextupole magnets necessary for chromatic error correction in the new lattice. It could then be an important effect in fighting against this instability. Therefore, evaluating this instability is important to ensure the machine's feasibility. This work studies the beam dynamics along the ramp in the RW instability regime using the code mbtrack2. The turn-by-turn tracking allows us to see the evolution of the beam thoroughly and understand how RW, synchrotron radiation, and ADTS impact the beam stability.

Funding Agency

Footnotes

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Yes

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Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D05: Coherent and Incoherent Instabilities Theory, Simulations, Code Developments