Contribution ID: **1308** Contribution code: **MOPM078** Type: **Poster Presentation**

Longitudinal injection for SAPS based on a double-frequency RF system

Monday, 8 May 2023 16:30 (2 hours)

In the fourth-generation storage ring light sources, the dynamic acceptance is usually small related to the extremely strong nonlinearity inherent in the multi-bend achromat design, making it difficult to implement traditional off-axis local-bump injection. It was found that a double-frequency rf system can be used for longitudinal injection with the help of rf gymnastics. However, such schemes require tuning the RF parameters during injection, which would challenge the RF hardware system and cause the bunch length shrinking of the circulated bunch. In this paper, we find that with proper parameters optimization, a double-frequency RF system with static parameters can be used for longitudinal injection. A detailed design of this scheme for the application in the Southern Advanced Photon Source (SAPS) is presented.

Funding Agency

Footnotes

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Session Classification: Monday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.T12: Beam Injection/Extraction and Transport