Contribution ID: **185** Contribution code: **TUP185-WEB** Type: **Student Poster Presentation**

# Microbunching study of the beam switchyard section of SHINE

*Tuesday 20 August 2024 20:40 (20 minutes)*

The microbunching instability (MBI) has become a critical issue in advanced X-ray free-electron lasers, posing a considerable challenge to achieving the desired beam quality and coherence. In the multi-bend beamlines of the beam switchyard system, the MBI effect can have a large gain because of the coherent synchrotron radiation (CSR). We have performed a comprehensive simulation with different initial beam parameters at the entrance of the beam switchyard. Different beam transport designs are used to evaluates the impact of MBI gain by isochronicity and to explore methods to suppress the MBI effect. This study provides practical guidance for the design of beam switchyard optics and the limitation of upstream beam quality.

## Footnotes

## Funding Agency

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**Session Classification:** Poster session

**Track Classification:** Electron beam dynamics