



Contribution ID: 26

Type: poster

Optimization of the Arc Compressor performance in the MariX Free Electron Laser

Wednesday, September 18, 2019 7:00 PM (1 hour)

The MariX FEL is a compact GeV-class X-ray source exploiting a two-pass 2-way acceleration in a Super-Conducting linac operated in continuous wave mode. A key component of this peculiar machine layout is the Arc Compressor (AC), a 300 m long beamline consisting of 14 “Double Bend Achromat” cells and a bidirectional quadrupole focusing channel, which allows the beam to be u-turned while it is being compressed to greatly increase its brightness and peak current.

In this contribution we present the performance of the AC of MariX and the solutions we adopted to solve the main issues that the beam dynamics encounters in a line of this kind.

We show the beam dynamics in the AC matching line which is designed to operate on beams propagating in both directions, considering the anti-symmetric quadrupole focusing behavior.

We study the Coherent Synchrotron Radiation (CSR) emission in the AC showing a scheme that preserves the low emittance granting also a linear compression in presence of strong CSR effects.

Lastly, we present a strategy to correct the residual dispersion-based beam tilt that is introduced by the CSR kick and would otherwise spoil the FEL emission. Further, the projected emittance is minimized cancelling the dispersive contribution.

Primary authors: ROSSETTI CONTI, Marcello (INFN Milano); ROSSI, Andrea Renato (MI); BACCI, Alberto Luigi (MI); PETRILLO, Vittoria (Università degli Studi di Milano); SERAFINI, Luca (MI)

Presenter: ROSSETTI CONTI, Marcello (INFN Milano)

Session Classification: Cheese and Wine Poster Session 2

Track Classification: WG4 - Application of compact and high-gradient accelerators