

Optimization of Korea-4GSR Booster Lattice for Increasing Dynamic Aperture Using Multi-Objective Genetic Algorithm

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The Korea-4GSR is an upcoming diffraction-limited synchrotron light source designed to provide X-rays with a brightness up to 100 times greater than existing sources. While a photocathode electron gun was initially selected based on the operational success of PAL-XFEL, a thermionic electron gun is also being considered to enhance operational stability. However, this transition results in an electron beam size approximately four times larger at the point of injection into the Booster, bringing it close to the original off-momentum dynamic aperture and potentially reducing injection efficiency.

To address this issue, we propose further optimizing the Booster lattice to expand the off-momentum dynamic aperture, thereby improving injection efficiency. This optimization will be performed using a multi-objective genetic algorithm (MOGA).

Paper submission Plan

Best Presentation

Yes

Contribution track

ICABU WG2. Beam Physics, Diagnostics & Novel Techniques

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