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## **CSR-induced projected emittance growth study for the beam switchyard at the European XFEL**

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Minimizing projected emittance of high brightness electron beam is important for efficient overlap between electron beam and radiation pulse in an FEL facility. Coherent synchrotron radiation (CSR) emission in a single bending section in the beam transport system usually introduces different slice energy modulation hence different slice transverse kicks in the designed dispersion-free lattice, causing projected emittance growth. Here we present theoretical and simulation study of CSR effect on the projected emittance growth in the beam switchyard arc before SASE2 undulator beamline at the European XFEL. We analyze arc optics impact on CSR effect, as well as emittance degradation compensation by controlling beam properties upstream of the arc. With the projected emittance optimized, the overall FEL radiation pulse energy can be improved.

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### **Footnotes**

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Yes

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