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Space charge limit for light sources

Monday 2 June 2025 16:00 (2 hours)

With the adoption of multi-bend achromat lattices and the aim for diffraction limit, the state-of-the-art light sources are approaching a point where their emittance becomes so small that the effects of space charge can no longer be ignored. Space charge produces a significant betatron tune spread that affects many aspects of beam dynamics: single particle dynamics to collective beam stability. But most importantly, space charge imposes a fundamental limit to the ultimate beam brightness that can be achieved in a synchrotron light source. We demonstrate that the only way to increase the beam brightness and therefore the photon brilliance further is to opt for a higher beam energy.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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Author: ANTIPOV, Sergey (Deutsches Elektronen-Synchrotron)

Co-authors: CORTÉS GARCÍA, Edgar Cristopher (Deutsches Elektronen-Synchrotron); AGAPOV, Ilya (Deutsches Elektronen-Synchrotron)

Presenter: ANTIPOV, Sergey (Deutsches Elektronen-Synchrotron)

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