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Design and optimization of an ERL-based X-ray FEL

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An energy-recovery-linac (ERL)-based X-ray free-electron laser (FEL) is proposed considering its three main advantages: i) shortening the linac by recirculating the electron beam by high-gradient SRF cavities, ii) saving the klystron power and reducing the beam dump power through the energy recovery in the SRFs, iii) producing a high average photon brightness with high average beam current. Such a concept has the capability of optimized high-brightness CW X-ray FEL performance at different energies with simultaneous multipole sources. In this paper, we will present the preliminary results on the optics design, parameter optimization, beam dynamics study and identification of potential R&D aspects.

Footnotes

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