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The simulation of beam-based alignment at S3FEL

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The proposed Shenzhen Superconducting Soft X-Ray Free-electron Laser (S³FEL) is a high-repetition-rate FEL facility which is currently commencing civil construction. The overlap between the electron beam and the radiation field is one of the critical determinants during the FEL amplification process, exerting a significant influence on the quality of FEL performance. The stringent requirement for straightness in both electron beam and radiation pulse can be achieved through the utilization of beam-based alignment (BBA) techniques. To optimize FEL performance, a combined approach incorporating electron beam-based alignment (e-BBA) and photon beam-based alignment (p-BBA) will be implemented at S³FEL. This paper presents theoretical analyses and simulation results regarding both e-BBA and p-BBA techniques at S3FEL.

Footnotes

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