

Physics and Applications of High Brightness Beams



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X-ray Regenerative Amplifier Free-Electron Laser

Monday, June 19, 2023 11:30 AM (25 minutes)

Despite tremendous progress in X-ray free-electron laser (XFEL) science over the last decade, future applications still demand fully coherent, stable X-rays that have not been demonstrated in existing X-ray FEL facilities. In this talk, we review the progress toward an X-ray regenerative amplifier FEL (XRAFEL) to produce both high-peak and high-average power FEL pulses with full temporal coherence. We discuss electron beam and cavity optics requirements, as well as various mechanisms to outcouple maximum amount of radiation power. Finally, we illustrate how an XRAFEL can be applied to a high-repetition rate XFEL and an ultra-compact XFEL to significantly increase the X-ray brightness or the spectral photon flux.

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