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## **Simulations Study of Reverse-taper Enhanced Harmonic Lasing at SXFEL**

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Generating so-called 'laser-like' X-ray in the full X-ray band has been a long-term challenge for seeded free electron lasers (FELs), which is generally limited by the up-frequency conversion efficiency and the materials of optical monochromators. Here, we demonstrate a reverse tapered undulator-enhanced harmonic lasing mechanism to possibly extend the photon coverage of the seeded FELs for fully coherent X-ray pulses in the full X-ray band. The mechanism adopts a reverse tapered undulator with a relatively longer magnetic period as the first stage to produce low-intensity X-ray pulses at the fundamental wavelength while imprinting the microbunching into the phase space of the electron beam. Besides, the technique has a relatively narrower bandwidth, which can possibly increase the repetition of the self-seeding mode.

### **Footnotes**

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