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Generating isolated attosecond soft x-ray free electron laser with optical beat lasers

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Attosecond soft x-ray pulses is of great importance for the study of ultrafast electronic phenomena. In this paper, a feasible scheme is proposed to generate isolated fully coherent attosecond soft x-ray free electron laser via optical frequency beating. Two optical lasers with the opposite chirp are used to induce a gradient frequency energy modulation, which helps to generate a gradually varied spacing electron pulse train. Subsequently, the undulator section with delay lines located between the undulators are used to amplify the target ultrashort radiation. Numerical start-to-end simulations have been performed and the results demonstrate that an isolated fully coherent x-ray free electron laser pulse is achieved with the peak power of 18 GW and pulse length of 650 as by using the proposed scheme.

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Footnotes

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