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Attosecond Polarization Modulation of X-Ray Radiation in a Free-Electron Laser

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Polarization is a fundamental property of light used in experiments to probe various properties of matter such as the chirality of molecules and crystal structures. There is increasing interest in generating bespoke radiation pulses for experiments with increasingly complex structures of polarization. At short wavelengths, free electron lasers offer an avenue to control the polarization structure at the point where the radiation is emitted through manipulation of the electron beam, removing the requirement for polarizing optics not readily available at x-ray wavelengths. This talk discusses a method for manipulating the polarization of FEL generated light based on temporal intensity modulation of radiation emitted in orthogonally polarized undulators. Simulations demonstrate the method can produce radiation that switches between orthogonal polarization states at attosecond timescales. Implementation of this ultra-fast polarization switching would provide a valuable new tool to the scientific community.

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Yes

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