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Generation of High-Power Free-Electron Laser Pulses with Orbital Angular Momentum

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The generation of x-ray pulses carrying orbital angular momentum from an x-ray free-electron laser (FEL) has attracted considerable attention due to the ability to directly change atomic states and develop new material characterization techniques. In this contribution, we report a new method for generating intense x-ray vortices. The method is based on the widely used self-amplified spontaneous emission scheme and does not require additional helical undulators or external laser systems. It can therefore in principle be employed by all existing XFEL facilities with limited hardware additions.

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