Hamburg Photon Science Colloquium

SYNCHROTRON RADIATION FROM AN ACCELERATING LIGHT PULSE

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We present the observation of synchrotron radiation resulting from a subpicosecond light pulse that moves in a circular path. A metasurface, consisting of an array of plasmonic nanoantennas, was used to guide an infrared pulse along a 100-μm-radius arc inside a $LiTaO_3$ crystal. The metasurface generates a self-accelerating wave, which belongs to a novel class of non-diffracting solutions to Maxwell's equations. Through three-wave mixing, the accelerating light pulse mixes with itself to generate a nonlinear polarization with THz components. As for a charge traversing a circular trajectory in vacuum, the moving nonlinear polarization emits THz synchrotron radiation over a scale of 100 μm, which is the smallest to date.

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