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THz-Driven Accelerator Components

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Plasmon- or phonon-polaritons excited at plane or structured interfaces or in sub-wavelength resonators by strong THz pulses are interesting candidates for miniaturized accelerator components. Often these structures show either electric or magnetic near-field enhancement alleviating the need for a strong driving THz source. Today laser-driven THz sources can produce single-cycle pulses with field strengths between 10 to 100 MV/m (electric) and around several Tesla (magnetic); they can be easily synchronized to a gun laser or any other laser in the accelerator chain and the THz free-space wavelength or the plasmon wavelength are well matched to a typical transverse electron bunch size on the order of 100 microns.

Here, we will discuss deflecting structures for electron streaking diagnostics, accelerating structures, and also miniaturized undulator structures.

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