

Terahertz Acceleration for Sub-Femtosecond X-ray Production

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We report on experimental advances towards the development of a compact high-brilliance attosecond relativistic electron source based entirely on optical and terahertz (THz) technology. Employing accelerating frequencies two orders of magnitude higher, i.e. in the THz range, when compared to conventional radio-frequency (RF) accelerators, brings several fundamental advantages: the field emission threshold for surface electric field increases to the GV/m range and high operating frequencies and fields also make bunch compression to the attosecond regime possible. The possibility of compact FEL-like X-ray sources combining THz accelerators and optical undulators will be discussed.