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Relativistic Attosecond Electron Bunches from Laser-Illuminated Droplets

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The generation of relativistic attosecond electron bunches is observed in three-dimensional, relativistic particle-in-cell simulations of the interaction of intense laser light with droplets. The electron bunches are emitted under certain angles which depend on the ratios of droplet radius to wavelength and plasma frequency to laser frequency. The mechanism behind the multi-MeV attosecond electron bunch generation is investigated using Mie theory. It is shown that the angular distribution and the high electron energies are due to a parameter-sensitive, time-dependent local field enhancement at the droplet surface.