Abstract Submitted
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The Ultimate Limit of High Harmonic Rescattering Radiation from Atoms and Ions in Ultrastrong Laser Fields[1] BARRY WALKER, JAKOB NIESSNER, EVAN JONES, JOEY SCILLA, DAVID MILLIKEN, JAMES MACDONALD, Univ of Delaware — The discovery of laser driven rescattering and the 3.17 times the ponderomotive energy rule in strong laser fields led to attosecond pulse generation, coherent x-rays, and high energy photoelectron production. As the laser field drives the interaction to higher energies, relativistic effects and the Lorentz force from the laser magnetic field enter into the dynamics and deflect the photoelectron continuum wave function. Recent studies of laser rescattering [2] have included these relativistic effects and the Lorentz force from the laser magnetic field to give a quantitative description of rescattering dynamics in the high energy limit, i.e. recollision energies of order 1000 Hartree. In this high energy limit, we treat the emitted high harmonic radiation from rescattering as a Bremsstrahlung process using the relativistic Larmor formalism. We report the radiated power, time dependent electric fields, and energy spectra for recollision near the ultimate cutoff for rescattering. The numerical results including the ion core electrons are shown compared to traditional Bremsstrahlung radiation results for an electron scattering from the Coulomb field of a bare nucleus.

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[2]M. Klaiber, et al, **Phy. Rev. Lett** 118, 093001

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