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Effects of Magnetic Field on Classical Ionization PATRICK GRUGAN, MICHAEL VIDETTO, CHRISTOPHER MANCUSO, SUI LUO, BARRY WALKER, University of Delaware, Newark DE 19716, USA — Classical equations of motion are solved numerically for one electron atoms in an intense laser pulse. The study investigates the influence of the laser magnetic field on ionization and rescattering. Many models of electron ionization have ignored the magnetic field of the laser pulse, but recent work has looked at the magnetic field's role in stabilization [1]. Work has been done to show that in the ultra-strong regime (intensities of $\sim 10^{18}$ W/cm^2) the laser magnetic field has an influence on rescattering [2]. Specifically, drift of the ionized electron along the laser propagation direction. We use a classical model of the atom, atomic number Z, with one electron and numerically integrate two sets of equations of motion, those with and those without the laser magnetic field. Observable quantities, such as electron radius and energy, are calculated and compared. The data shows that the laser magnetic field does have some influence on ionization, specifically on electron dynamics before ionization and the time required for ionization.

[1] L. N. Gaier and C. H. Keitel, PRA 65, 023406 (2002).
[2] S. Palaniyappan, I. Ghebregziabher, A. Dichiara, J. MacDonald, and B. C. Walker, PRA 74, 033403 (2006).

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