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Circularly Polarized Attosecond Pulses and Atto-Magnetism KAI-JUN YUAN, ANDRE BANDRAUK, Departement de Chimie, Faculte de Sciences, Universite de Sherbrooke — We present a method for producing a single circularly polarized attosecond pulse by an intense few cycle elliptically polarized laser pulse combined with a mid-infrared laser pulse from numerical solutions of the time dependent Schrödinger equation for aligned H_2^+. Simulations show that in the intense mid-infrared laser field with frequency 62.5 THz (wavelength $\lambda = 4800$nm) and intensity $\sim 10^{14}$W/cm^2, a single circularly polarized 114 as pulse can be generated by an elliptically polarized 400nm and 5x10^{14}W/cm^2 laser pulse with ellipticity 0.59. With such generated ultrashort circularly polarized pulses, localized "spinning" electron wave packet can be created on the attosecond time scale and the sub-nanometer molecular scale, leading to time dependent electronic currents and attosecond magnetic fields inside molecules. It is shown that with an intense circularly polarized attosecond UV laser pulse with intensity 10^{16}W/cm^2, a strong magnetic field with several tens of Teslas can be induced.

[1] K.J. Yuan and A.D. Bandrauk, J. Phys. B 45, 074001 (2012); Phys. Rev. Lett. 120, 023003 (2013).

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