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Simulations of directed field ionization[1] JASON J. BENNETT, BIANCA R. GUALTIERI, ZOE A. ROWLEY, Ursinus College, VINCENT C. GREGORIC, Bryn Mawr College, THOMAS J. CARROLL, Ursinus College, MICHAEL W. NOEL, Bryn Mawr College — In selective field ionization, a slowly rising electric field pulse ionizes a Rydberg atom such that lower-energy-state electrons are generally detected later in time than higher-energy-state electrons. As the electric field increases, the Rydberg electron's amplitude spreads among many nearby energy levels by splitting and recombining at hundreds of avoided crossings. In "directed field ionization," we use a genetic algorithm to engineer perturbations in the pulse and using this technique we have demonstrated control of the shape of the time-resolved ionization signal[2]. We have recently extended this approach to separate the previously unresolved signal from two nearby initial energy levels (see V. Gregoric's poster in this session). We present simulations of the pulse evolution which allow us to visualize the electron's path to ionization and the shape of the wave function and we compare our calculations to experimental results.

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[2]V. Gregoric, *et al.*, Phys. Rev. A **96**, 023403 (2017)

Thomas Carroll
Ursinus College

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