

Abstract Submitted
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Directed Field Ionization¹ VINCENT C. GREGORIC, Bryn Mawr College, XINYUE KANG, Ursinus College, ZHIMIN CHERYL LIU, Bryn Mawr College, ZOE A. ROWLEY, THOMAS J. CARROLL, Ursinus College, MICHAEL W. NOEL, Bryn Mawr College — Selective field ionization is an important experimental technique used to study the state distribution of Rydberg atoms. This is achieved by applying a steadily increasing electric field, which successively ionizes more tightly bound states. An atom prepared in an energy eigenstate encounters many avoided Stark level crossings on the way to ionization. As it traverses these avoided crossings, its amplitude is split among multiple different states, spreading out the time resolved electron ionization signal. By perturbing the electric field ramp, we can change how the atoms traverse the avoided crossings, and thus alter the shape of the ionization signal. We have used a genetic algorithm to evolve these perturbations in real time in order to arrive at a target ionization signal shape. This process is robust to large fluctuations in experimental conditions.

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Vincent C. Gregoric
Bryn Mawr College

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