

Abstract Submitted
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Coherent control of charge exchange in strong-field dissociation of LiF GREG ARMSTRONG, BRETT ESRY, J R MacDonald Laboratory, Kansas State University — The alkali-metal-halides family of molecules are useful prototypes in the study of laser-assisted charge exchange. Typically these molecules possess a field-free crossing between the ionic and covalent diabatic Born-Oppenheimer potential curves, leading to $\text{Li}^+ + \text{F}^-$ and $\text{Li} + \text{F}$ in LiF. These channels are energetically well-separated from higher-lying potentials, and may be easily distinguished experimentally. Moreover, charge exchange involves non-adiabatic transitions between the ionic and covalent channels, thereby allowing the investigation of physics beyond the Born-Oppenheimer approximation. The focus of this work is to control the preference between ionic and covalent dissociative products. We solve the time-dependent Schrödinger equation for the nuclear motion in full dimensionality, and investigate a pump-probe scheme for charge-exchange control [1]. The degree of control is investigated by calculating the kinetic-energy release spectrum as a function of pump-probe delay for the ionic and covalent fragments. This work is supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy. [1] B. Rigsbee, Master's Thesis, Kansas State University (2015).

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