Abstract Submitted
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Angle-dependence of strong-field ionization of singly-charged Chloromethane and Bromomethane[1] PETER SANDOR, MARK W. GORDON, ROBERT R. JONES, University of Virginia, ADONAY SISSAY, PAUL ABANADOR, FRANÇOIS MAUGER, METTE GAARDE, KENNETH J. SCHAFER, KENNETH LOPATA, Louisiana State University — We have studied the ionization probability of CH_3Cl and CH_3Br molecules exposed to intense 780 nm laser pulses as a function of the angle between the molecular axis and the linear laser polarization. Experimentally, the molecules are exposed to two laser pulses. The first induces no ionization but, instead, creates a rotational wave packet within each molecule that exhibits preferential alignment in the laboratory frame at specific time delays. We measure the variation in the single ionization yield as a function of the delay between the two pulses. We obtain the angular dependent ionization probability by fitting the observed delay-dependent yield to moments of the angular distribution of the rotational wavepacket which can be accurately calculated. The experimentally determined angular distributions are compared to results of new Time-Dependent Density Functional Theory (TD-DFT) predictions. Both experiment and theory find that even though the molecules have Highest Occupied Molecular Orbitals (HOMO-s) that are very similar, the angle dependence of their ionization yields differ substantially.

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