

Abstract Submitted  
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**Characterization of Field-Free Orientation of OCS<sup>1</sup>** SANJAY KHATRI, ALI AZARM, ROBERT JONES, Univ of Virginia — Creating transient, field-free orientation is an important capability for exploring and controlling strong-field processes within molecules. It has been demonstrated using phase-controlled, 2-color ( $1\omega + 2\omega$ ) laser pulses and single-cycle THz fields. While some measurements are fairly insensitive to some sample ionization, caused by the orienting fields prior to the initiation of the strong-field process of interest, others are less forgiving and require that the molecular sample remain neutral with negligible electronic or vibrational excitation. We have used Coulomb explosion induced by an intense, time-delayed 780nm 35 fs laser pulse, to characterize the effectiveness of 2-color, 780nm+390nm, 50 fs laser pulses for orienting rotationally cooled OCS molecules, as a function of the 2-color intensity and the degree of ionization induced by the 2-color field alone. Our comparison of the results obtained in two cases - one in which a 780nm pre-alignment pulse precedes the 2-color field, and the other when the 2-color pulse acts alone - enables a determination of the suitability of these approaches in experiments seeking to measure angle-dependent strong-field single ionization. Future measurements will extend the comparison to non-ionizing THz induced orientation.

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