

Abstract Submitted
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Laser-induced fragmentation of D₂: detection of metastable D* atoms M. ZOHRABI, J. MCKENNA, J.J. HUA, A.M. SAYLER, NORA G. JOHNSON, B. GAIRE, K.D. CARNES, B.D. ESRY, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Physics Department, Kansas State University — In a recent Letter, Manschwetus *et al.* [Phys. Rev. Lett. **102**, 113002 (2009)] reported experimental evidence for the formation of metastable H* fragments upon dissociative ionization of H₂ by a strong laser field. Their finding was explained using a frustrated tunnel ionization model. Here, we present our measurements of D* formation from D₂ that encompass the dependence of this process on pulse duration, intensity, ellipticity and angular alignment. We find that the mechanism suggested by Manschwetus *et al.* is consistent with our experimental data. However, other mechanisms might also be consistent with the data. A few possible mechanisms have been eliminated by our theoretical work on the fragmentation of the transient D₂⁺, and further investigation of other mechanisms is underway. Supported by the Chemical Sciences, Geosciences and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy.

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