

Abstract Submitted  
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**Ionization and dissociation of acetonitrile with intense laser pulses**<sup>1</sup> Y. BORAN, A. A. KOLOMENSKII, M. SAYRAC, H. A. SCHUESSLER, Texas AM University, J. STROHABER, Florida AM University — We present an experimental study of laser induced ionization and dissociation of acetonitrile molecule ( $\text{CH}_3\text{CN}$ ) by using a reflectron type time-of-flight (TOF) mass spectrometer. In these experiments an amplified ultrafast Ti:sapphire laser system emitting 50fs pulses of radiation centered at 800nm wavelength and having a 1kHz repetition rate was used. At the intensity of  $3 \times 10^{14} \text{W/cm}^2$  we observed singly charged ions  $\text{CH}_n\text{CN}^+$  ( $n=0-3$ ),  $\text{CN}^+$ ,  $\text{CH}_2^+$ ,  $\text{C}^+$ , and  $\text{H}^+$  as well as fragments with higher charge states  $\text{C}^{2+}$ ,  $\text{C}^{3+}$ ,  $\text{CH}_2^{2+}$ , and  $\text{CH}_2^{3+}$ , when using both linear or circular polarizations of the driving field. We also present and analyze laser intensity dependences for the yields of the parent ion and other fragments ranging from  $4.4 \times 10^{13} \text{W/cm}^2$  to  $3.3 \times 10^{14} \text{W/cm}^2$ . Finally, we investigated angular dependences of acetonitrile fragmentation by changing the polarization direction of the laser beam with respect to the TOF axis and concluded that yields of heavy fragments do not show strong angular dependences, while light fragments, especially with higher charge states, demonstrate a strong anisotropy.

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