Ionization and Coulomb explosion of small hydrocarbons exposed to short intense laser pulses\textsuperscript{1} SERGIY BUBIN, KALMAN VARGA, Vanderbilt University — We have performed first principles numerical simulation of high field ionization in small hydrocarbons followed by a Coulomb explosion. The process was driven by 790 nm 27 fs laser pulses of high intensity (of the order of $10^{15}$ W/cm$^2$), for which case there exists recent experimental data [S. Roither et al., Phys. Rev. Lett. 106, 163001 (2011)]. We have analyzed the spectra of ejected protons and investigated the ionization-fragmentation mechanism that takes place when molecules are subjected to short intense laser pulses. The results of our simulations support the all-at-once (concerted) fragmentation scenario proposed by Roither et al. At the same time we also observed some quantitative differences between the theoretical and experimental spectra.

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