

Abstract Submitted  
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**Substitution effects in strong and ultrastrong field ionization of chlorinated methane** PATRICK GRUGAN, SIYU LUO, SAM HUGHES, RYAN WELCH, BARRY WALKER, Univ of Delaware — Intensity dependent yields of carbon and chlorine ion fragments from chlorinated methane species are studied in strong and ultrastrong laser fields. Comparison to carbon ion fragments from methane under similar conditions shows no difference in the ion yields for chloromethane. Methane derived carbon ions display no anisotropy with respect to the laser polarization direction where chloromethane has little or no anisotropy, within the standard of error for our spectrometer. The energy distributions of carbon and chlorine ions are also collected and it is shown that the fragment energy of the highest charge states of carbon can reach energies of 20 eV to 40 eV for  $C^{3+}$  and  $C^{4+}$  respectively. A previous study of the intensity dependence of carbon ions from methane<sup>1</sup>, showed that production of the lowest charge states of carbon,  $C^+$  and  $C^{2+}$  are heavily influenced by molecular ionization effects and that the highest charge states of carbon,  $C^{5+}$ , show no molecular dependence in its production. The current work details a similar result for the chlorinated methane series.

<sup>1</sup>S.Palaniyappan et. al., Phys. Rev. Lett. **100**,183001(2008)

Patrick Grugan  
Univ of Delaware

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