Abstract Submitted
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Metastable Decay of Molecular Ions PENGQIAN WANG, Western Illinois University — Metastable dissociation of singly and multiply ionized molecules has been observed in two-dimensional coincidence mass spectra of molecules caused by electron impact dissociative ionization. These molecules include ethane, propane, butane, carbonyl sulphide and isocyanic acid. The decay of the molecular ions occurs either in the ion acceleration region or in the drift tube of a Wiley-McLaren type mass spectrometer, which exhibits two distinctly featured traces on the coincidence mass spectrum if the life time of the molecular ions is comparable with the time-of-flight of the ions. These traces generally start from a coincidence island, which indicates the species of the daughter ions, and ends at a point on the diagonal of the spectrum, which indicates the species of the parent ion. The intensity distribution and the geometric properties of the decay traces can be used to retrieve valuable information on the decay lifetime and dissociation dynamics of the molecular ions. Some new decay channels have been discovered. Asymmetric charge distribution and orientation of the molecular ions in the mass spectrometer has also been observed. Project supported by the WIU-URC grant.

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