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**Parallel detection of molecular and atomic ions with a delta-doped CCD at the focal plane of a miniature mass spectrometer** A. D. JEWELL, T. J. JONES, M. SINHA, S. NIKZAD, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA — A delta-doped back-illuminated charge-coupled device (CCD) was used for the simultaneous detection of low-energy atomic and molecular ions at the focal plane of a miniature mass spectrometer (MMS). MMS is a JPL-developed instrument based on a focal plane double sector mass analyzer (Mattauch-Herzog geometry). Delta-doped, back-illuminated CCD technology enables high efficiency detection of low energy ions and molecules by eliminating the dead layer usually associated with solid-state detectors. The combination of delta-doped CCD and MMS enables high-speed, precision mass spectrometry of ions and molecules. Compounds studied include benzene, toluene, methylene chloride, and iron pentacarbonyl. Spectral images were captured using integration times from 5 to 120 seconds. Results are two-dimensional images of the spectral output for each molecule. Signal intensity and position were compared to NIST spectra and calculated ion trajectories to verify the identification of molecular peaks and mass to charge ratios.

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