Observations of Recent Comets at X-ray and Infrared Wavelengths: Implications for Laboratory and Theoretical Measurements of Atomic and Molecular Properties

Michael J. Mumma
Laboratory for Extraterrestrial Physics,
NASA Goddard Space Flight Center

The discovery of X-ray Emission from comet Hyakutake by EUVE and ROSAT has revealed a previously unknown class of X-ray emitters - nearly a dozen comets have now been detected in soft X-rays. Similarly, high resolution spectroscopy of comets Hyakutake and Hale-Bopp at infrared and radio wavelengths has revealed a host of new parent volatiles, and hundreds of spectral lines were detected from as yet unidentified species. These discoveries will be used to indicate new directions for laboratory and theoretical investigations. It is anticipated that future observatories in the infrared and sub-millimeter (SIRTF, SOFIA, FIRST, NGST) and in the extreme ultraviolet and X-ray domains (FUSE, AXAF) will cause a corresponding shift in emphasis in the research and analysis supported by NASA.