

Detection of H₂ Fluorescence in Eridanus Region with FIMS

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FIMS (Far ultraviolet IMaging Spectrograph) instrument is an imaging spectrograph on the STSAT-1 (Science and Technology Satellite-1) spacecraft with band passes of 900–1150 (short wavelength band) and 1350–725Å's (long wavelength band). Several targets were observed for the purpose of instrumental calibration and performance demonstration from December, 2003 to January, 2004. During the time, the Eridanus region was observed to get spectral image of emissions from the interstellar matter known to be created and excited by supernova explosion, stellar winds, and strong UV radiation from an O/B association. In the long wavelength band, distinct fluorescent emission features of the hydrogen molecule were detected in the region whose spectrum is fit with a fluorescent emission model associated with PDR (photon dissociation region). The comparisons with a model prediction show that the spectral features are not only the consequence of the photon excitation on molecular clouds but also of the heating and excitation by the shocks passing the region. According to the spectrum analysis and emission model studies, the FUV emission of H₂ molecules from the Eridanus supershell implies the preexisting molecular clouds in the region is swept and heated by interstellar shocks up to $\sim 2,000 \pm 1,000$ K and then is being exposed to strong radiation field from the Orion O/B association.