

A Search for Variability in the HCN/H₂CO Ratio

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Our group made submillimeter observations of comet Hale-Bopp using the Heinrich Hertz Telescope in Arizona. One of our goals was to search for temporal variability in coma abundance ratios that might be caused by inhomogeneities in the nucleus and any "jets". At this time, we report no clear evidence for HCN/H₂CO variability and suggest that in late March 1997, the bulk ratio in the coma varied by less than 20%. The HCN/H₂CO ratio was chosen for monitoring due to a fortuitous alignment in our double sideband system that allowed us to simultaneously observe the HCN (4-3) line at 354.505 GHz and an H₂CO line at 351.768 GHz. Simultaneous observations result in scan-to-scan calibration errors being removed from our measured ratio, and give us the ability to recognize changes on the shortest possible time scales. A further reason to monitor the HCN/H₂CO ratio comes from the Giotto spacecraft, which may have observed an H₂CO rich jet from the Halley nucleus. We measured the ratio with 10 minute integration times from 29 March 1997 03:30 to 06:30, 29 March 22:10 to 30 March 01:15, and 30 March 05:50 to 06:50, all times GMT. An analysis of half the data failed to resolve any unambiguous variations. At the time of the conference, a full analysis of our complete HCN/H₂CO data set will be presented, including mapping of the spatial distribution of the two species. The work of M.H. was performed at the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.