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Galileo and HST Observations of Jupiter's Polar Stratospheric Haze

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Data from all of the optical instruments on Galileo as well as recent imaging from HST reveal a polar stratospheric haze that is much more dynamic than had been supposed a few years ago. Spectra at UV wavelengths (200-300 nm) show color variations, with aerosols being redder closer to the pole. Images at UV wavelengths show features invisible at other wavelengths, such as a high-latitude oval the size of Jupiter's Great Red Spot. These features are ephemeral. The asymmetry in UV reflectivity between north and south suggests a strong role for an auroral mechanism in the formation of the haze. The particles are highly polarizing at blue and red wavelengths yet they have much more forward scattering than do very small spherical particles. That combination of optical properties suggests that the particles are aggregates of very small monomers as first proposed by West and Smith (*Icarus \bf 90* , 330-333, 1991). The particles

absorb sunlight in the stratosphere, producing a substantial latitudinal gradient in radiative heating which can be a driver for circulation. In order to make an assessment of the heating rates it is important to understand the optical properties of the aerosols over a broad wavelength range, as functions of altitude and latitude. The availability of UV-IR spectra and images from Galileo and HST is fueling a new generation of models. This work was performed by the Jet Propulsion Laboratory, California Institute of Technology as part of the NASA Jupiter System Data Analysis Program.

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