

Keck Observations of Dusty Rings in our Solar System

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All four giant planets are surrounded by ring systems, which typically consist of a combination of large and small bodies, as well as fine dust. With the 10-m W.M. Keck telescope on Mauna Kea (Hawaii) we have focused on observing the dusty rings of these planets. In this review I will summarize our data sets. I will focus on our most recent results with regard to Jupiter and Uranus, both observed during ring plane crossings.

Jupiter's ring system was observed in December 2002 and January 2003 at 2.2 micron, where we used both the facility near-infrared camera NIRC with a pixel size of 0.151" (~500 km at Jupiter), and the adaptive optics camera NIRC2, with a pixelsize of 0.04" and 0.01". The images were "onion-peeled" to provide radial scans of the rings. We will compare results of the main ring with Galileo data, and comment on similarities and differences with respect to the location of parent material in the ring. The radial structure of the gossamer rings is very different than expected based upon the Burns et al (1999) formation scenarios. The rings are not sheets of material, but narrow rings located just interior to the orbits of Amalthea and Thebe. The Amalthea ring shows a structure analagous to the main ring. Its inner boundary is near the location of synchronous orbit. Radial variations in the Thebe ring suggest "sculpting" by Lorentz resonances.

We will present images of Uranus "hot of the press"; we are scheduled to observe in July and August when the rings are edge-on.