

Technical Page

Proposal Type: Regular
 General Category: Planetary Radar
 Observation Category: Solar System
 Total Time Requested: 22.5 Hours

Proposal Title: S-band radar mapping of Saturn's rings

ABSTRACT:

In 1999 and 2000 we obtained the first true radar images of Saturn's rings, using the Arecibo S-band solar system radar at a wavelength of 12.6 cm. The opening angle of the rings was $19.9^\circ - 23.6^\circ$, and dual-circular polarization data were collected over a period of 5 days at each opposition. Both radar images show strong $m=2$ azimuthal variations in the rings, similar to the asymmetry seen in the A ring at visible wavelengths which is believed to be due to trailing wake-like structures associated with gravitational instabilities in the rings. We propose to continue these observations as the ring opening angle increases to 25.9° in December 2001. As Saturn moves to more northerly declinations, the available tracking time at Arecibo increases to a maximum of 32 min per day in 2001. In addition to probing the azimuthal asymmetry, circular polarization ratio measurements vs opening angle will shed light on the question of the thickness and vertical structure of the rings. We will also look for a reappearance of the low Doppler excess reported in the mid-1970s at larger ring opening angles, and better characterize its source.

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I do NOT want to do remote observing.

Instrument Setup

S-Band radar

Atmospheric Optical Instruments:

Special Equipment or setup: Radar data acquisition software + Portable Fast Sampler.

RFI Considerations

Frequency Ranges Planned

2370 - 2390