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 October 1999 we obtained the first true radar images of Saturn's rings, using the Arecibo S-band solar system radar at a wavelength of 12.6c̆m. The opening angle of the rings, B, was $-19.9°$, and dual-circular polarization data were collected over a period of five days. We continued similar observations in November 2000 and in December 2001, at $B = -23.6°$ and $-25.9°$, using the greater bandwidth of the new Portable Fast Sampler. All of our images show a strong $m = 2$ azimuthal variation in the rings' cross section, similar to the asymmetry seen in the A ring at optical wavelengths and 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 a maximum of $-26.6°$ in December 2002. In addition to probing the azimuthal asymmetry, radar albedo and circular polarization ratio measurements vs opening angle will shed light on the question of the thickness and still poorly-understood vertical structure of the rings.

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Service Observing Request

- [X] None
- [ ] All of the observing run.
- [ ] Part of the observing run.
- [ ] Queue Observing

Remot e Observing Request

- [X] No
- [ ] Maybe
- [ ] Yes

Instrument Setup

S-Band radar S-band receiver

Atmospheric Observation Instruments:

Special Equipment or setup: Radar data acquisition software + Portable Fast Sampler. CBR pulsar receiver used as backup.

RFI Considerations

Frequency Ranges Planned

2370 - 2390