

Technical Page

Proposal Type: Regular
 General Category: Planetary Radar
 Sub-Category: Radar
 Observation Category: Solar System
 Total Time Requested: 44-56 Hours

Proposal Title: Radar Imaging of Asteroid 253 Mathilde in Summer 2001

ABSTRACT:

Arecibo radar reconnaissance of 253 Mathilde can extend and complement physical information derived from the 1997 NEAR-Shoemaker flyby, enabling us to characterize Mathilde better than any other main-belt asteroid. NEAR revealed a low-density "rubble pile" dominated by huge craters, but the spin state was not determined and 40 percent of the surface was not imaged. Groundbased lightcurves suggest a very slow, non-principal-axis rotator. Sixteen nights of delay-Doppler radar images will provide the signal strength and rotation-phase coverage needed to disentangle spin-state parameters from shape parameters, resulting in an accurate determination of the rotation state, a significant refinement to the NEAR-based shape model, and estimates of the center-of-mass location and of near-surface bulk density and roughness. This will provide us with otherwise unavailable information on Mathilde's internal density distribution and could illuminate the formation mechanism for the large craters.

Name	Institution	E-mail	Phone	Student
Christopher Magri	University of Maine at Farmington	magri@maine.edu	207-778-7369	no

I do NOT want to do remote observing.

Instrument Setup

S-Band radar S-band receiver

Atmospheric Optical Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

2380 (S-band radar)