

Technical Page

Proposal Type: Regular
General Category: Planetary Radar
Observation Category: Solar System
Total Time Requested: 28 Hours

Proposal Title: A Radar Search for Regoliths on the Asteroids 11066 Sigurd and 4179 Toutatis
ABSTRACT:

We propose radar observations of two asteroids that will pass close to Earth, with the goal of using a linear polarization analysis to search for the presence of regolith material. If the incident radar wave refracts into a surface (such as a regolith) and is reflected by buried scatterers, the return echo will have a linearly polarized component that can be measured using a full Stokes parameter analysis of the echo. This technique has been successfully applied to the asteroid 1999 JM8 and we hope to survey a large sample of asteroids to correlate the presence of regolith with asteroid size, shape, and composition. Here we request observations of 11066 Sigurd and 4179 Toutatis. The size of asteroid 11066 Sigurd is not known, but its absolute magnitude suggests that it is around 4 km in diameter, which will give a signal-to-noise of around 200 per run. Toutatis has been observed with radar before, however, in 2004 it makes its closest approach to Earth between the years 1353 and 2562. Such a close approach will allow particularly high-resolution, high signal-to-noise imaging, ideal for the polarization analysis.

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|---------------|--------------------|---------------------------|----------------|---------|
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Service Observing Request

Remote Observing Request

- None
- All of the observing run.
- Part of the observing run.
- Queue Observing

- No
- Maybe
- Yes

Instrument Setup

S-Band radar S-band receiver

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned