Technical Page

Proposal Type: Long-term
General Category: Planetary Radar
Observation Category: Solar System
Total Time Requested: 83 Hours

Minimum Useful Time: 2

Proposal Title: Probing Asteroid Physics, Solar Physics, and Fundamental Physics with Radar Astrometry *ABSTRACT:*

We request 83 hours of planetary radar time over the next three years to bring a decade-long project to fruition. We have been quantifying non-Keplerian effects in the orbits of Near-Earth Asteroids that reach deep inside the gravitational well of the Sun with the following three objectives: 1) to measure Yarkosvky drift rates, which can inform us about asteroid masses and thermal properties, 2) to provide the first purely dynamical measurement of the solar quadrupole moment J2 with 10% uncertainties, 3) to refine solar system tests of general relativity (PPN parameter beta at the 10e-4 level). The effects are separable because they produce different signatures on the orbital evolution. The program is nearing the stage where its full impact can be realized: capitalizing on our previous investment with the observations proposed here, we will have accumulated 15 observations of 5 different asteroids, sufficient to provide 3 Yarkovsky drift rates, a meaningful estimate of beta, and an estimate or upper bound on J2.

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Remote Observing Request

X	Observer will travel to AO
	Remote Observing
	In Absentia (instructions to oper-
	ator)

Instrument Setup

S-Band radar S-band receiver

Atmospheric Observation Instruments:

Description of Observer Equipment: PFS

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned