

**Title:** Asteroid Radar Astronomy

**Abstract:** Asteroid Radar Astronomy is the study of solar system bodies by means of Earth-based radar telescopes. It is a field in which the experimenter controls the direction, amplitude, frequency, phase, polarization, and time/frequency structure of the transmitted waveform. Analysis of radar echoes yields information on range, velocity, spin, reflectivity, and polarization properties of the target. Range and velocity measurements with fractional precisions of 10 ppb enable tests of physical theories, quantification of non-gravitational effects, and dramatic improvements in asteroid trajectory predictions. Reflectivity measurements with decameter spatial resolutions provide detailed terrain maps and superb characterization of near-Earth asteroids, including binary and triple systems. Polarization data reveal information about near-surface roughness and composition. The Arecibo planetary radar is the most powerful Earth-based tool to characterize the physical properties and dynamics of many Near-Earth Asteroids. This characterization is essential in multiple contexts: scientific understanding of the asteroid population, impact hazard mitigation, human exploration, and resource utilization.

**BIO :** Jean-Luc Margot is Professor and Chair of the Department of Earth, Planetary, and Space Sciences at UCLA and is also Professor of Physics and Astronomy at UCLA. He is a planetary astronomer who conducts research on the properties of planetary bodies with a variety of spacecraft and telescopes, including the second largest telescope on Earth at the Arecibo Observatory in Puerto Rico, the twin Keck telescopes on Mauna Kea in Hawaii, and the Kepler space observatory. His research interests include the dynamics and geophysics of planetary bodies, the architecture of planetary systems, radio and radar astronomy, and SETI.