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☐ **NEO Characterization Results**

OBSERVATIONS OF NEO USING 32-M RADIO TELESCOPES OF QUASAR VLBI NETWORK

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ABSTRACT

Bistatic radar observations of the asteroid 2003 TL4, binary asteroid 2003 YT1 and 2011 UW158 have been conducted and partially processed. The radio signals transmitted from 70-m antenna of Goldstone Deep Space Communications Station and reflected from the asteroids have been successfully received by the 32-meter radio telescopes in Zelenchukskaya, Badary and Svetloe observatories of "Quasar" VLBI network. The software for echo signal processing and spectrum analyzer was designed. It includes the polar silhouette estimation, using the method of Ostro et al. (1990) by geometric relation between echo power spectrum and the shape of rotating asteroid. The near-surface roughness is estimated using the ratio of the left circular polarization to the right one. The software was successfully implemented for the asteroid 2011 UW158 yielding its size of 350 x 520 meters and the spin period of 36±3 min. These results are consistent with the size estimation of Naidu et al. (2015) and lightcurve period (Gary, 2016). We obtained the circular polarization ratio close to the known values 0.34 for the majority of NEAs, which implies that the near-surface roughness is average at centimeter-to-decimeter spatial scales (Benner et al., 2008). We also developed the software for scheduling radio astronomical observations. The main goal of the scheduler to estimate the signal-to-noise ratio for the selected configuration of mono- or bistatic antenna system and celestial body (asteroid, comet or satellite). Following this positive experience we plan to continue bistatic radar experiments using VLBI technique for obtaining continuous wave spectra and range-Doppler images in the near future. For instance, we are going to receive the radio echoes from the asteroids 2014 JO25, Florence 3122 and 2012 TC4 in 2017.

Reference

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