

Observation of 44(Nysa) Asteroid by IST60 Telescope

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Abstract. In this study, the main belt asteroid (44) Nysa, which is also a known member of the Nysian asteroid family, was observed by IST60 telescope. The orbital elements were compared with MPO(Minor Planet Center) and NASA Horizons Web-Interface results.

1. Introduction-Method

Asteroid studies enable us to learn about the physical properties and chemical composition of asteroid surfaces through the analysis of the sunlight reflected off the asteroid and the calculation of asteroid orbit. Orbital measurements can show us if an asteroid poses a threat the world or not. Examples of how asteroid impacts on the world have created a disaster have already been seen. Nysa was observed at Ulupnar Observatory located in anakkale Onsekiz Mart University. The observations were carried out using a CCD camera which is installed in the IST60 telescope. The CCD camera has 2048x2048 pixels, a pixel size of 13.5 microns, and the focal length of the telescope is 480 cm.

2. Results

The orbital elements were calculated using the equatorial coordinates of Nysa obtained from the 1220 observations made from the IST60 telescope at the 13th, 14th, 15th, 25th, 26th of September 2013 and the 5th, 6th of May 2015. We compared the results of these data with orbit parameters from NASA's JPL Small-Body Database Browser and Minor Planet Center, and the results showed very good agreement. The results obtained are $\Omega=131^{\circ}.562$, $\omega=343^{\circ}.295$, $i=3^{\circ}.7071$, $a=2.423143$ AU, $e=0.14870$ and $\zeta=2456906.100345$ JD. We compared our results with the Minor Planet Center and NASA Horizons Web-Interface results and found that they are consistent with an accuracy of $0^{\circ}.003$ for Ω , $0^{\circ}.029$ for ω , $0^{\circ}.0005$ for i , 0.0002 AU for a , and 0.0004 for e . Similar differences occur in the third or fourth digits of the trajectory reductions made by adding new observations at different dates. This shows that Nysa's orbit is still exposed to perturbations of Jupiter and Mars. If not only the Nysa asteroid, but also the positions of the asteroids in the system are determined and new orbital elements are calculated from these positions, at least the results obtained on how the dynamic structure of the solar system in the inner region occurred can provide important clues to the theoretical researchers.

3. Acknowledgements

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Reference

Canbay, R. 2017, DETERMINATION OF THE ORBITAL ELEMENTS OF ASTEROID (44) NYSA, M.Sc. THESIS, Istanbul University