ABSTRACT FOR ORAL PRESENTATION

PHYSICAL PARAMETERS OF THE TNO 2007 UK_{126} OBTAINED FROM A STELLAR OCCULTATION

G. Benedetti-Rossi[1], M. W. Buie[2], B. Sicardy[3], J. L. Ortiz[4], R. Vieira-Martins[1,5], J. M. Keller[6], F. Braga-Ribas[7], J. I. B. Camargo[1,8], M. Assafin[5], N. Morales[4], R. Duffard[4], A. Dias-Oliveira[1], P. Santos-Sanz[4], J. Desmars[9], A. R. Gomes-Júnior[5], R. Leiva[2,10], J. Bardecker[11,16], J. K. Jr. Bean[16], A. M. Olsen[11], D. W. Ruby[12,16], R. Sumner[16], A. Thirouin[13], M. A. Gómez-Muñoz[14], L. Gutierrez[14], L. Wassermann[13], D. Charbonneau[15], J. Irwin[15], S. Levine[13], B. Skiff[13]

Obtaining physical characteristics of the Trans-Neptunian objects (TNOs) can provide and reveal important clues about the primordial protoplanetary nebula, planet formation, and other evolutionary processes, as the inferred chemical, thermal, and collisional processes that they underwent tell us something about the evolution of the outer Solar System. However, their large distances make the study of those bodies difficult, and our knowledge about their sizes, shapes, albedo, densities, and atmospheres remains fragmentary. To work around this problem, stellar occultation technique is a very accurate tool to study those objects, as it provides sizes and shapes at km-level, can detect atmospheres at nanobar-level, and is even sensitive to features such as jets and rings. This technique is rivaled only by spacecraft flybys, which have, however, much higher cost. We present results derived from the first multi-chord stellar occultation by the trans-Neptunian object (229762) 2007 UK_{126}, observed on 2014 November 15. The event was observed by the RECON project and IOTA collaborators throughout the United States. A satisfactory elliptical fit to the seven chords yelded an equatorial radius of $R = 338^{+15}_{-10}$ km and equivalent radius of $R_{eq} = 319^{+14}_{-7}$ km. Assuming that the object is a Maclaurin spheroid with indeterminate aspect angle, and using two published absolute magnitudes for the body, we derive possible ranges for geometric albedo between $p_V = 0.159^{+0.007}_{-0.013}$ and $p_R = 0,189^{+0,009}_{-0,015}$, and for the body oblateness between $\epsilon = 0.105^{+0.050}_{-0.040}$ and $\epsilon = 0.118^{+0.055}_{-0.048}$. For a nominal rotational period of 11.05 h, an upper limit for density of $\rho = 1740$ kg m^{-3} is estimated for the body.

[1] Observatório Nacional, ON-MCT&I, Brazil (gugabrossi@gmail.com).
[2] LESIA, Observatoire de Paris, Université Pierre et Marie Curie, Université Paris-Diderot, France
[3] Southwest Research Institute, Boulder, CO, USA
[4] Instituto de Astrofísica de Andalucía, IAA-CSIC, Spain
[5] Observatório do Valongo, OV/UFRJ, Brazil
[6] California Polytechnic State University, San Luis Obispo, CA, USA
[7] Universidade Tecnológica Federal do Paraná - UTFPR, Brazil
[8] Laboratório Interinstitucional de e-Astronomia - LIneA, Rio de Janeiro, Brazil
[9] Institut de Mécanique Céleste et de Calcul des Éphémérides - Observatoire de Paris, UMR 8028 CNRS, France
[10] Instituto de Astrofsica, Facultad de Fsica, Pontificia Universidad Catlica de Chile, Santiago 7820436, Chile
[11] IOTA, International Occultation Timing Association, USA
[12] University of Nevada, Reno, NV, USA
[13] Lowell Observatory, Flagstaff, AZ, USA
[14] Instituto de Astronomía - Universidad Nacional Autónoma de México - UNAM, Mexico
[15] Harvard-Smithsonian Center for Astrophysics, MA, USA
[16] RECON, Research and Education Collaborative Occultation Network