Study of transneptunian objects through stellar occultations

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The physical parameters of the transneptunian objects (TNO's) such as size, shape, density, presence of atmosphere, provide important information on their formation and evolution. At more than 30 astronomical units (au) from the Sun, those objects receive low solar radiation and have low mutual collisions so they can be considered as remnants of the primordial outer Solar System. Besides that, information on TNO's is of great relevance when trying to establish a general formation scenario for the recently discovered planetary systems.

The problem is that such bodies have a diameter smaller than 2300 km (Eris, one of the largest TNO, has 2326 km) and, when viewed from Earth, they subtend angles smaller than 50 milli-arcseconds, a fact that makes their resolution very poor with current imaging systems. One method to obtain very accurate information on the TNO's is the stellar-occultation technique. Sizes at kilometer accuracies and pressure at nanobar levels can be achieved with this method. Shape, mass, density and other physical parameters can also be derived using this technique.

Since 2010, we observed stellar occultations of several TNO's (Varuna in 2010 and 2013; Eris in 2010; 2003 AZ_{84} in 2010 and 2011; Makemake in 2011; Quaoar in 2011 and two in 2012; 2002 KX_{14} in 2013; and finally Sedna in 2013) besides some other occultations of the Pluto system and of the largest Centaurs. We also predicted future events in 2014 and 2015 for the largest 40 TNO's and Centaurs. In this work, we will present new results obtained from recent stellar occultations of TNO's.