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THE DYNAMICAL ENVIRONMENT OF POTENTIALLY HAZARDOUS BINARY ASTEROID (285263) 1998 QE2.

Abstract

The binary asteroid (285263)1998 QE2 is one of the largest known potentially hazardous asteroids (PHAs), measuring 3.2 km with an 800 m satellite. It is considered a potentially hazardous asteroid (PHA) due to its size and proximity to Earth, with the last known approach to Earth of 0.039 au (15 lunar distances) on May 31, 2013. The next closest approach to Earth is within 1 au will be on May 16, 2119, when the binary system will pass 34 lunar distances. During the 2013 approach, high-resolution radar data were collected at the Arecibo and Goldstone Observatory, assisting in the physical and dynamic characterization of the system, which made it possible to obtain a 3D shape model for the primary and an approximate shape model for the secondary component. We will use the PSEM potential series expansion method to model the gravitational field, applied to the derived shape model to study the dynamic environment of the system, determining the equilibrium points and stability, a methodology that presents a reduced computational cost, preserving the precision of the model. Approximately 70 binary and triple near-Earth asteroid systems are known, and understanding the dynamic environment around these systems could provide clues about the origin and evolution of these bodies.