ASTEROID ROTATION AND SHAPE: GRAVITATIONAL AGGREGATE SIMULATIONS

Paolo Tanga[1], Marco Delbo[1,2], Daniel Hestroffer[3], Derek C. Richardson[4]

1.*Laboratoire Cassiopée, Observatoire de la Côte d'Azur, France.*
2.*INAF/Osservatorio di Torino, Italy.*
3.*Institut de Mécanique Céleste et Calcul des Éphémérides, Paris, France.*
4.*University of Maryland, USA.*

In the recent past, we used simulations of the gravitational collapse of a mono-disperse set of spherical particles for studyjng shape and spin properties of re-accumulated asteroid family members. The results show that only a category of shapes (flattened, two axis spheroids) are directly created. Moreover, they concentrate in specific regions of the spin/flattening plane. This numerical evidence is in contradiction with observations that show a variety of three-axial objects, scattered in a wide range of possible shape and spin combinations. Also, the theory of equilibrium figures predicts that three axial shapes should exist. The question of their origin is thus open. We will thus discuss two possibilities to solve this issue: an insufficient variety in initial conditions; spin changes and re-shaping induced by secondary impacts.