

Abstract Submitted
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Radiation Recoil Effects on the Dynamical Evolution of Asteroids

DESIREE COTTO-FIGUEROA, THOMAS S. STATLER, Ohio University — The thermal reemission from irregularly shaped bodies results in a torque that can change the rotation rate and the orientation of the spin axis. We present the results of the first simulations that self-consistently model the YORP effect on the spin states of dynamically evolving aggregates. We follow the evolution of aggregate objects computing the sequence of spin states and YORP torques through which they evolve as the changing spin alters their shape, which subsequently changes the YORP torques. The YORP effect has an extreme sensitivity to the topography of asteroids (Icarus 202, 501-513). If the spin-driven reconfiguration leads to a shape of the aggregate that is nearly symmetric, the YORP torques could become negligibly small or even vanish. This would imply a self-limitation in the evolution of the spin state. Moreover, subsequent reconfigurations could lead to a random walk making the evolution of the spin state completely stochastic. An extensive and statistical analysis of the simulations is conducted to determine whether or not the spin evolution is stochastic and whether the YORP effect is self-limiting.

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