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The Long-term Rotational Behavior of Ceres and Vesta TIANDAN WU, S.G. ALEXANDER, Miami University, N.P. ABEL, University of Cincinnati — The DAWN mission which was launched in September of 2007 will visit both the dwarf planet Ceres and the asteroid Vesta. We have calculated the long-term (10 My) evolution of the obliquity of these two objects using a gravitational N-body simulation. For each object, we calculate the obliquity fluctuations for three cases: the first is with the entire solar system present; the second includes just Jupiter and the Sun; and the final is just the Sun. Our results indicate that Jupiter is the dominant perturber for both Ceres and Vesta. In the full solar system case, we find that both Ceres and Vesta show fluctuations in their obliquities with a range of approximately twenty degrees and periods of about 20 ky for Ceres and about 50 ky for Vesta. We show that these fluctuations are not due to inclination variations, but are due to changes in the orientation of the spin axis. Large variations in the obliquity of Ceres and Vesta may have a significant impact on the evolution of their surface characteristics.

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