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Note

Abrupt alteration of Asteroid 2004 MN4's spin state during its 2029 Earth flyby

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Abstract

We predict that when Asteroid 2004 MN4 passes 5.6±1.4 Earth radii from Earth's center on April 13, 2029, terrestrial torques during the flyby will alter its spin state in a dramatic manner that will be observable using groundbased telescopes. Although the asteroid will most likely not undergo catastrophic disruption, it may be subject to localized failure across its surface and interior, providing a unique opportunity to measure otherwise inaccessible mechanical properties of an asteroid.

Keywords: Asteroids; Rotational dynamics; Rotation; Dynamics; Radar

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