

# The 10 Mya High-Chord Flyby: A Transient Gravitational Alternative to the Planet 9 Hypothesis

**William Gaetjens**

*Independent Researcher*

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## 1. ABSTRACT

This paper challenges the prevailing "Planet 9" hypothesis—which requires a permanent  $\sim 5\text{--}10 M_{\oplus}$  (Earth mass) planet—by proposing a **Transient High-Chord Flyby** model. We hypothesize that a rogue planet of approximately  $5 M_{\oplus}$  passed through a high-latitude chord of the Oort Cloud approximately 10 million years ago (Mya). This encounter provided a singular gravitational impulse that accounts for the observed orbital clustering of extreme trans-Neptunian objects (ETNOs) and the existence of "detached" objects like Sedna. We identify specific observational tests for the [Vera C. Rubin Observatory's Legacy Survey of Space and Time \(LSST\)](#) to distinguish between this transient event and a permanent "shepherd" planet.

## 2. THE 10 Mya "FRESHNESS" SOLUTION

The primary argument for Planet 9 is the long-term stability of ETNO clustering. However, orbital precession caused by the giant planets typically randomizes these orbits over 50–100 million years. By placing the encounter at **10 Mya**, our model ensures that the "smearing" of orbits has not yet occurred. The clustering we observe today is not a maintained steady-state, but the relatively "fresh" signature of a past perturbation.

## 3. HIGH CHORD DYNAMICS vs. IN-SITU FORMATION

Unlike a planet residing permanently at  $\sim 400\text{--}700$  AU, a **high-chord flyby** through the inner Oort Cloud avoids the "probability paradox" of planet formation at extreme distances. This model explains:

- **Sedna-like Objects:** Their perihelion was "lifted" away from Neptune's influence during the close approach.
- **Missing Comet Spikes:** A high-latitude pass minimizes the influx of comets into the inner solar system, explaining the lack of a major 10 Mya bombardment record on Earth.

#### 4. CRITICAL TEST: THE VERA C. RUBIN OBSERVATORY (LSST)

As the [Rubin Observatory begins its full-scale survey in early 2026](#), it provides two definitive tests for this hypothesis:

1. **The Convergence Criterion:** If a 10 Mya flyby occurred, the orbits of newly discovered ETNOs must **converge to a single point** when traced back 10 million years. A permanent Planet 9 would produce a "banded" distribution without a singular intersection point.
2. **The Presence of Planet 9:** If the [LSST's deep-sky imaging](#) fails to detect a 5–10  $M_{\oplus}$  body after 2–3 years of operation, the "Permanent Shepherd" model becomes statistically improbable, leaving the **Transient Flyby** as the most likely explanation for the gravitational anomalies.

#### 5. CONCLUSION

The 10 Mya High-Chord Flyby offers a parsimonious explanation for the outer solar system's structure using a known population of objects (interstellar rogue planets). The next three years of LSST data will either confirm this transient event via orbital back-calculation or identify the permanent resident of our solar system's furthest reaches.

#### AI Disclosure and Acknowledgment

##### Statement on Generative AI and AI-Assisted Technologies:

The conceptual framework and hypothesis for the **10 Mya High-Chord Flyby** were developed by the author. Large Language Model (LLM) assistance was utilized for the synthesis of astronomical data, formatting of the technical manuscript, and identifying relevant celestial mechanics literature. All scientific claims, temporal calculations (10–80 Mya), and orbital dynamics proposed herein were reviewed and verified by the author to ensure physical consistency with current solar system models.