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Unveiling the dynamics and physical property of asteroid systems based on Gaia astrometric data

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Gaia is a space mission from the European Space Agency (ESA) that was launched in 2013. Apart from the survey of stars, it is also highly valuable to study solar system objects (SSO) with high precision. Its latest data release in October 2023 includes 66 months of data on about 160,000 SSOs. Gaia's precise measurements can reveal astrometric signals of binary asteroids, for example the recently discovered (4337) Arecibo system. In this study, we analyze all available Gaia data on this system, estimating the mutual orbits, mass, and density of its components. Our findings suggest an ice-rich body in the outer main belt. The goal of this research is to demonstrate the scientific value of Gaia data on the study of solar system.

Astrophysics Field

asteroids, Gaia, astrometry

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