Characterisation of Trans-Neptunian binaries candidates from LSST

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 - Astrometry data
 - Photocentre offsets

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- First paper
 - Asteroid (4337) Arecibo: Two ice-rich bodies forming a binary. Based on Gaia astrometric data.
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- Different resolving cases



unresolved



unresolved



singly resolved





Gaia and TNBs

- about 140 trans-Neptunian systems
- Gaia observes 24 TNOs
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 - Most of the TNBs are primary resolved
 - Pluto Charon system is double resolved
- Obtained results for mass and densities



Gaia and TNBs - The Eris/Dysnomia system

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- Magnitude ~ 21th
- 10 years of astrometric data
- 350 000 objects
- sub-mas level precision
- 90 mas resolution unit
- 2013-2024

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- First light July 2025
- Magnitude ~ 24th
- Better than 0.2 arcseconds sampling
- ~ 10 mas precision
- Possible of resolve of the satellite



Possible observations



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- Separation in pixel size
- 19 TNB and 3 MB in doubly resolved cases
- 7 paris in singly resolved cases



What LSST can do

- Detecting many TNOs and satellites

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What LSST can do

- Detecting many TNOs and satellites
- Determining better heliocentric orbit and mutual orbit
- Constraining individual mass
 - Formation history
 - Internal structures of the bodies

Reference

THE GAIA-LSST SYNERGY Željko Ivezić, Steven M. Kahn and Patricia Eliason

The Solar System in The LSST science book

Tuning the Legacy Survey of Space and Time (LSST) Observing Strategy for Solar System Science