

Contact binaries in the trans-Neptunian belt

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New Horizons: 2014 MU₆₉

NEW HORIZONS
ULTIMA
1 JANUARY

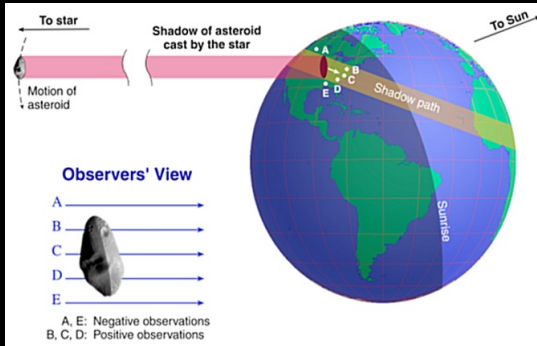


CLOSE FLYBY OF
THULE
2 0 1 9

NASA's New Horizons spacecraft next target: 2014 MU₆₉, nicknamed Ultima Thule.

2014 MU₆₉: small trans-Neptunian object (~20-30 km), dynamically Cold Classical (least evolved TNOs), no rotational period, no composition ... no direct observation from the ground.

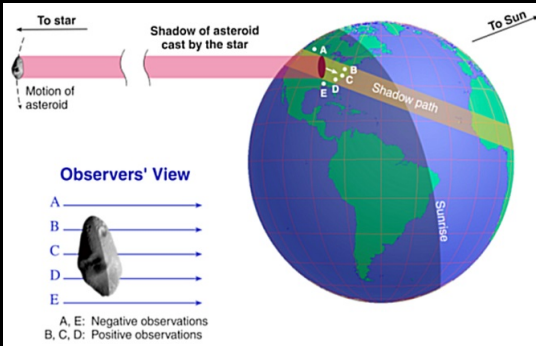
Shape of 2014 MU₆₉



- Stellar occultation \Rightarrow Shape, size, albedo, satellite(s)/ring(s), atmosphere, topographic feature(s).
- Positive stellar occultation by 2014 MU₆₉ last year detected from 5 stations.
- Shape of 2014 MU₆₉ \Rightarrow contact binary.
- Contact binaries are found across the Solar System...
- ... and a lot of them.



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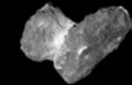
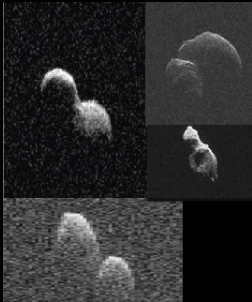
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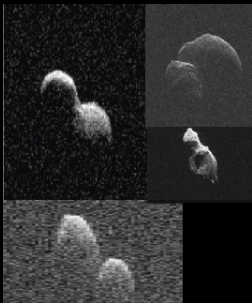


Not to scale



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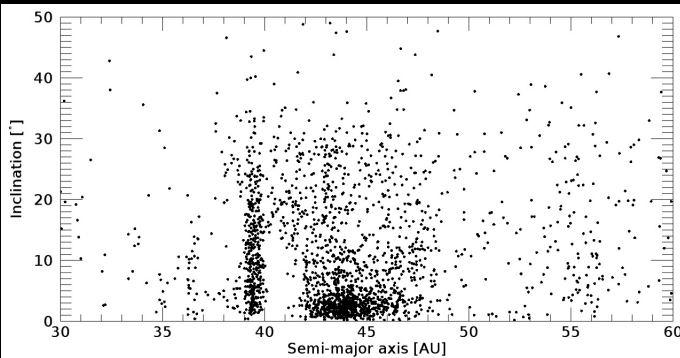


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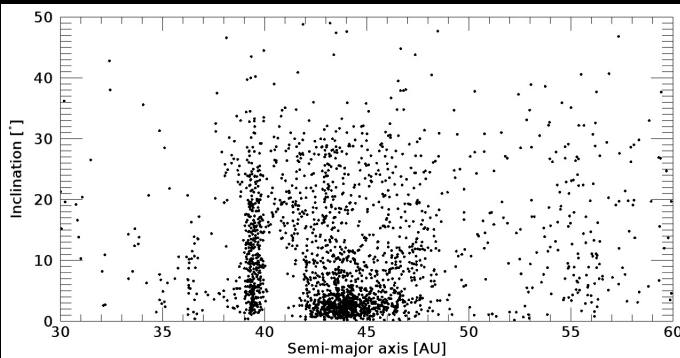
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Contact binaries in the trans-Neptunian belt



- Expected fraction of contact binaries: **30%**
- Large sample \Rightarrow formation/evolution (when, where, how), fractions in sub-populations, physical characteristics ...
- ... context for the New Horizons flyby of 2014 MU₆₉
- Observations, excluding 2014 MU₆₉.
- Fractions, formation/evolution, characteristics? \Rightarrow New Horizons context

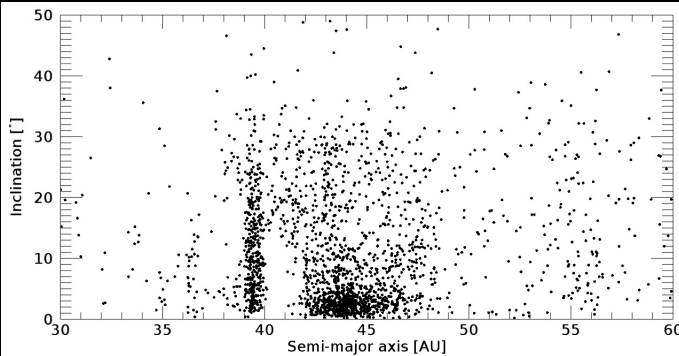
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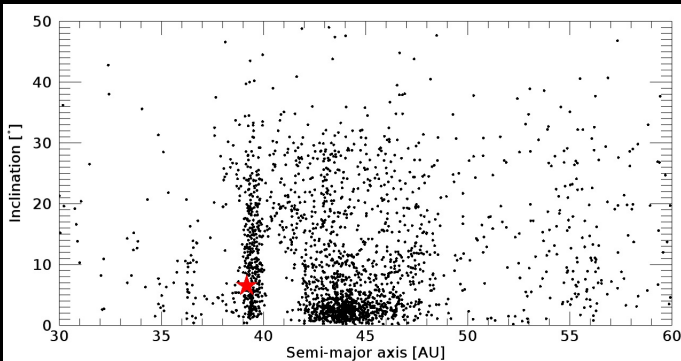
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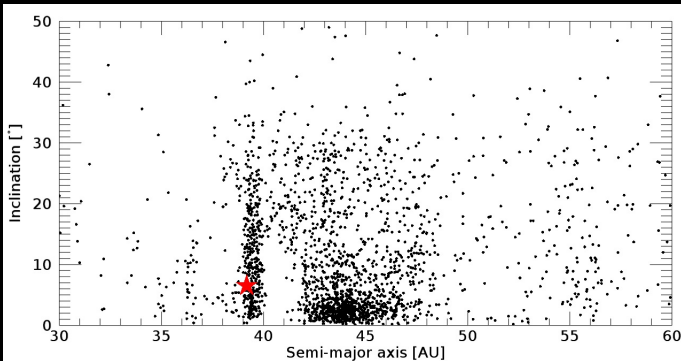
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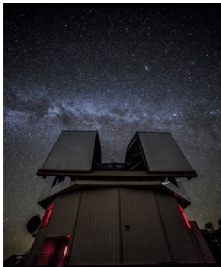
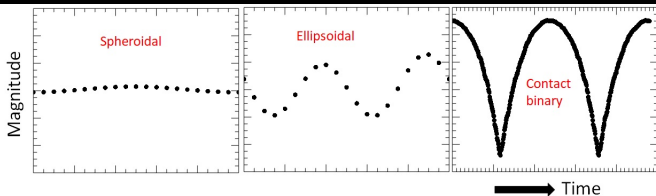


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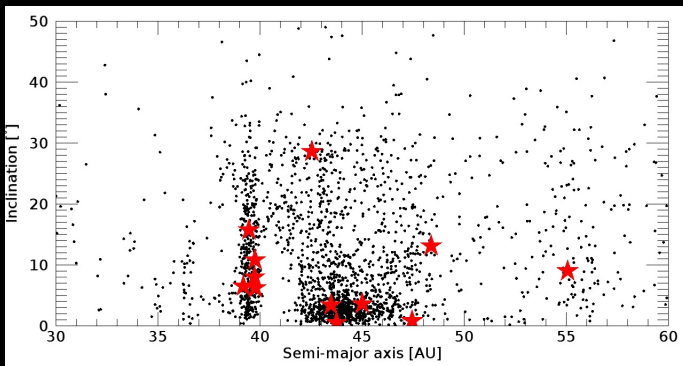
Our survey



- Identification of contact binaries with lightcurves.
- Two facilities: 4.3 m DCT and 6.5 m Magellan telescopes.
- 12 contact binaries known so far: 11 found by us.
- 40-50% in the Plutinos \Rightarrow Excess.
- \sim 10% in the Cold Classicals \Rightarrow Deficit.
- Not a lot of MU_{23} -like object in the Cold Classicals.
- Excess/deficit \Rightarrow formation/evolution?

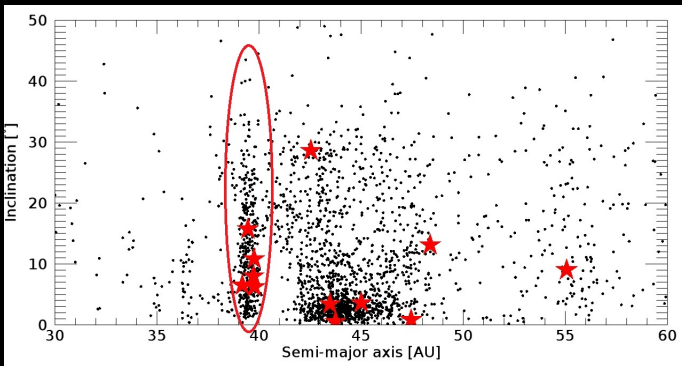
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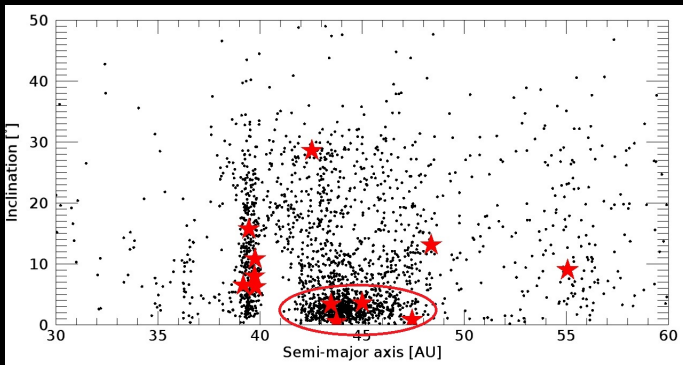
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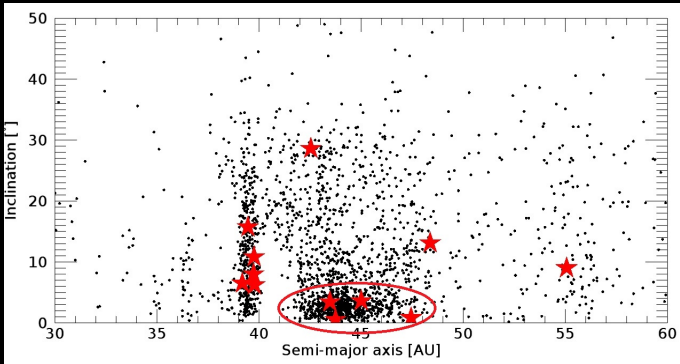
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