A Search for Trans-Neptunian Objects: Finding a Needle in a Cosmic Haystack

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What is a trans-Neptunian object (TNO)?

- Object whose mean distance from the Sun > 30AU
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- Object whose mean distance from the Sun > 30AU

The most famous TNO: Neptune
Why are TNOs interesting?
Recently, some disputes have arisen.

"We conclude that the orbital distribution of the OSSOS sample is consistent with being detected from a uniform underlying angular distribution."

- OSSOS

… But their survey only looked at 170 square degrees.
Where do we look?
How biased are we to finding certain classes of objects?
How can we characterize a TNO?

Semimajor Axis

Eccentricity

Argument of Perihelion

Longitude of Ascending Node

Inclination
How can we characterize a TNO?

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- Eccentricity
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How can we characterize a TNO?

Semimajor Axis

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Longitude of Ascending Node

Inclination
Begin with a uniform population of objects.
Where have we looked?... And when?
Reducing the Required Computation
How do we determine what we would actually detect?
Review and Conclusions

- There is dispute as to how ‘real’ the clustering of extreme TNOs actually is.
- DES can provide another voice in the discussion.
- We have a mostly operational survey simulator.
- We expect to be able to debias our entire survey by October.
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Backup Slides
The OSSOS Results