2020 KS11
2023 LORRI Observations
Preliminary Report

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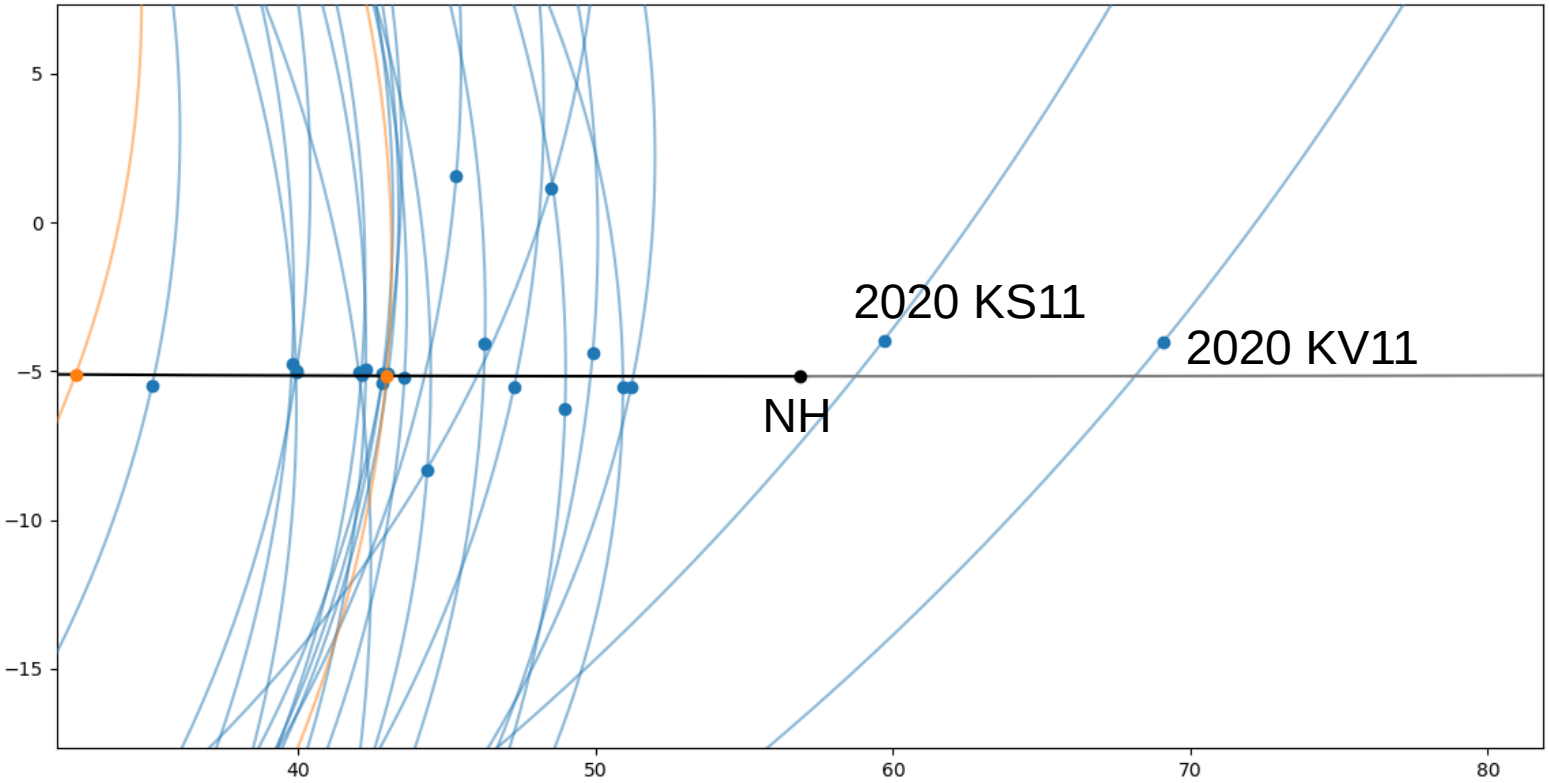
Oct 26, 2023

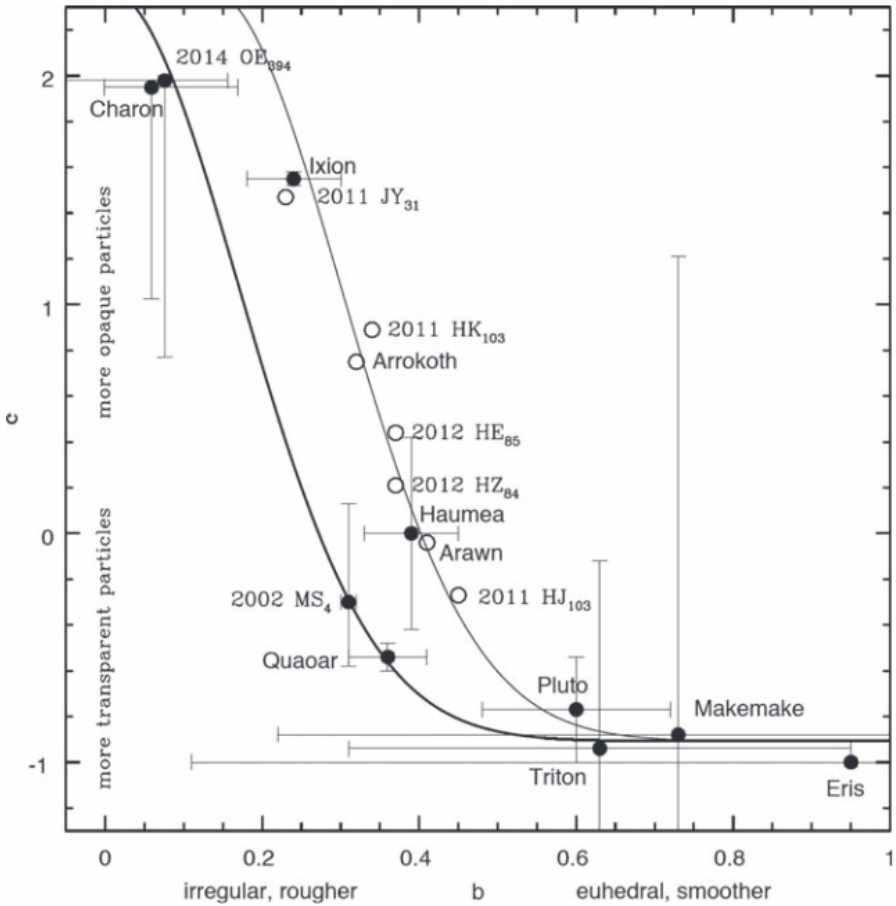
New Horizons “DKBO”s

- “Distant KBOs” is New Horizons jargon for any KBO we observe that isn’t a flyby
  - At distances from <0.1 AU to >50 AU



DKBO Phase Curves

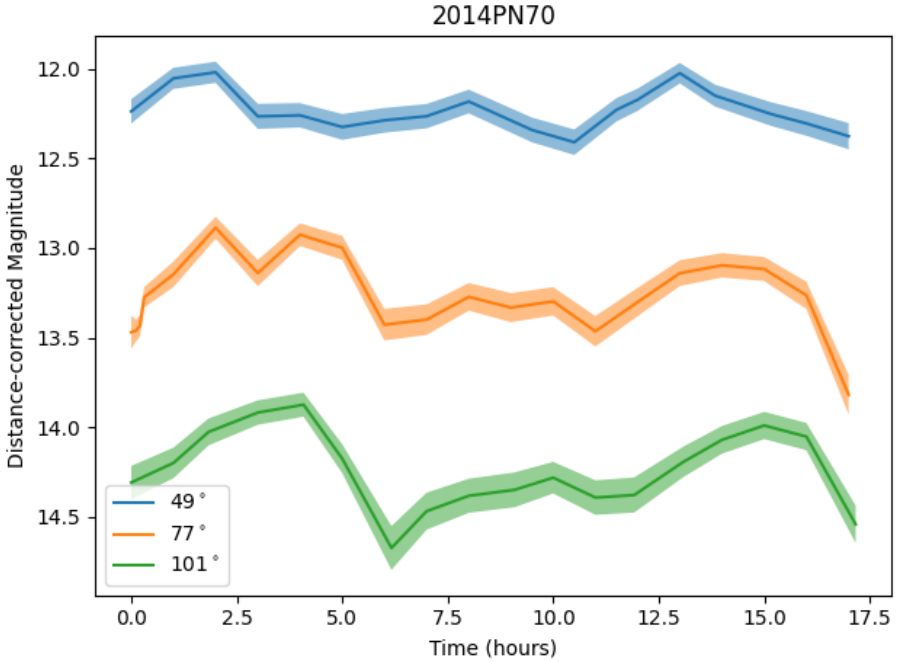
- KBOs can only be observed from Earth at <2° Sun-KBO-Observer “Phase angle”
- New Horizons has observed KBOs at up to 120° phase
- Phase curves constrain the surface properties of the KBOs and allows comparison with icy satellites
- KBOs beyond 50 AU may be in a different space weathering environment, affecting their surfaces

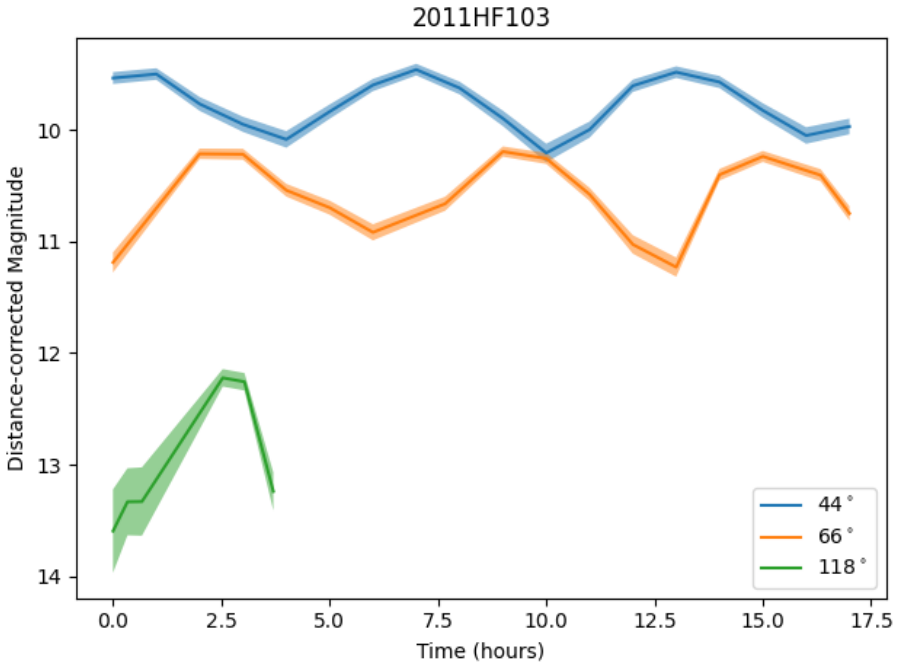


Surfaces of Dwarf Planets (solid) and smaller KBOs (open) from New Horizons (Verbiscer et al 2022)

DKBO Lightcurves & Shape

- Rotational lightcurves at different phase angles can also reveal the shapes of KBOs
- Some previous DKBOs have shown lightcurves that seem to be consistent with being contact binaries, like Arrokoth

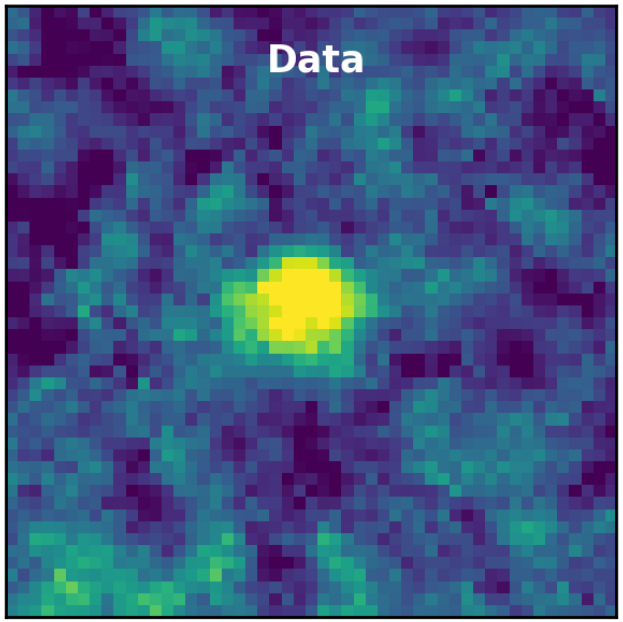


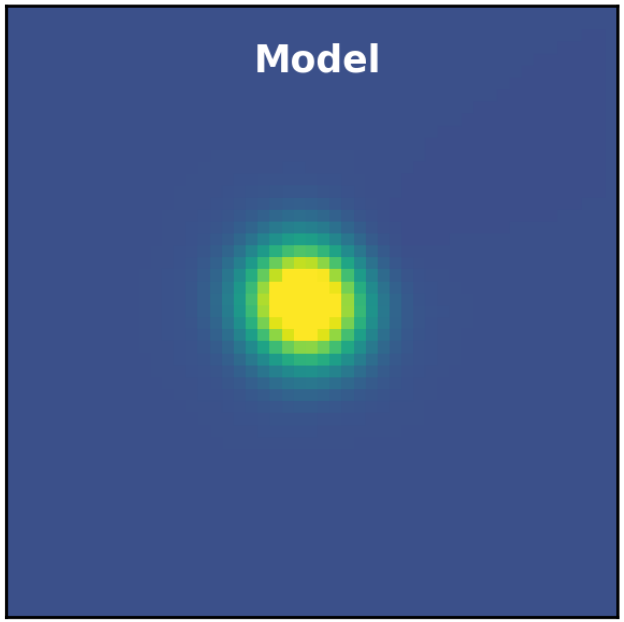


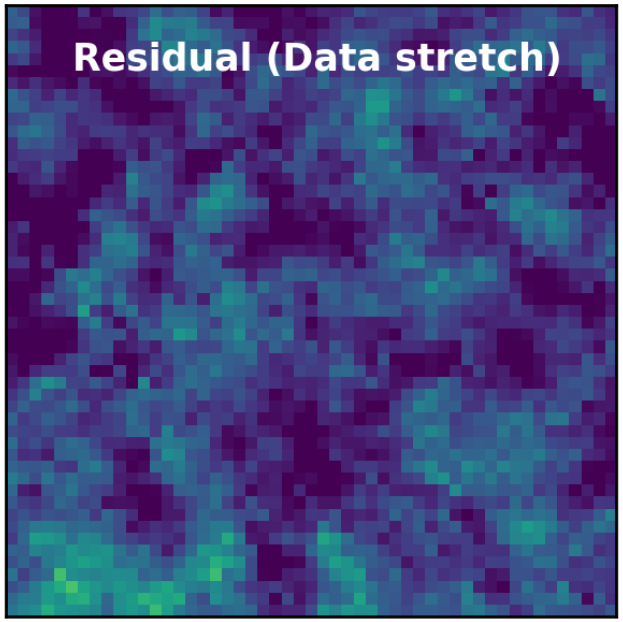
2020 KS11

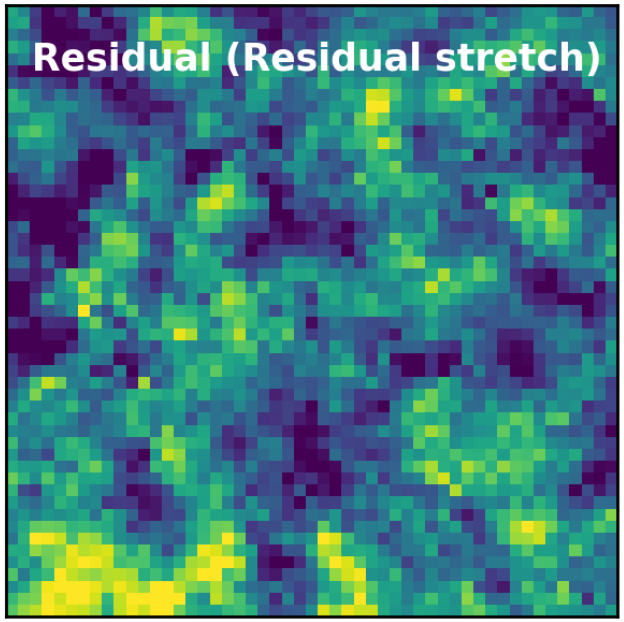
- Discovered in 2020 Subaru search
- a=99.5 AU, e=0.64, i=2.66°
  - q=35 AU, Q=164 AU
- All 12 visits images are downlinked, metadata for 11/12 so far
- Nominally can observe again in spring 3-axis, when it is brighter and higher phase angle

PSF Fit of 11/12 Stack

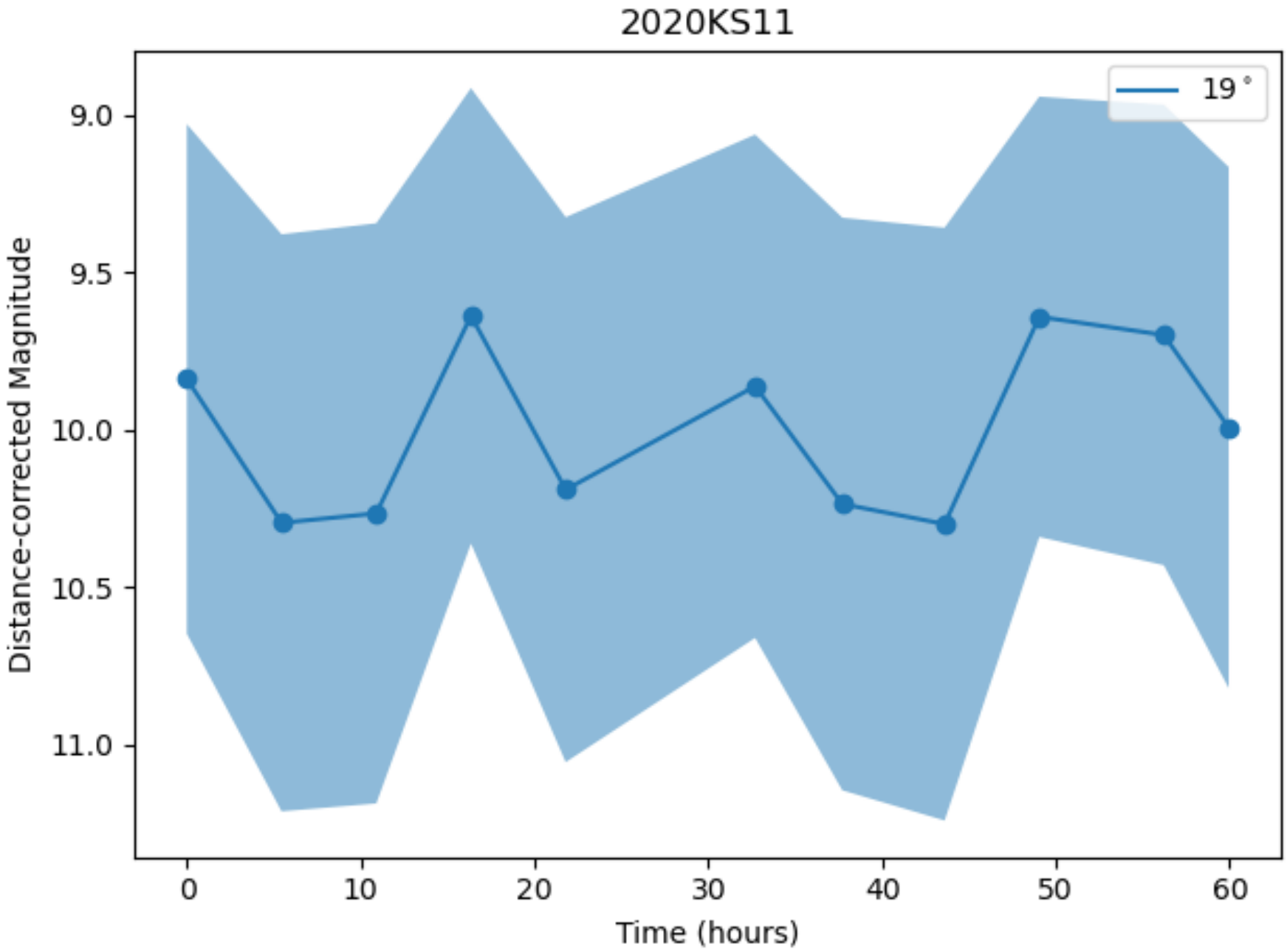








Lightcurve


2020KS11
19°
Distance-corrected Magnitude
9.0
9.5
10.0
10.5
11.0
0
10
20
30
40
50
60
Time (hours)

Summary

- 2020 KS11 is recovered at 59 AU
  - Solid recovery with 11/12 downlinked
  - Slight lightcurve variation over 60 hrs
- Provides a test for possible future DKBO observations even further from the Sun, e.g. 2020 KV11