First results from stellar occultation campaign on slow rotators.

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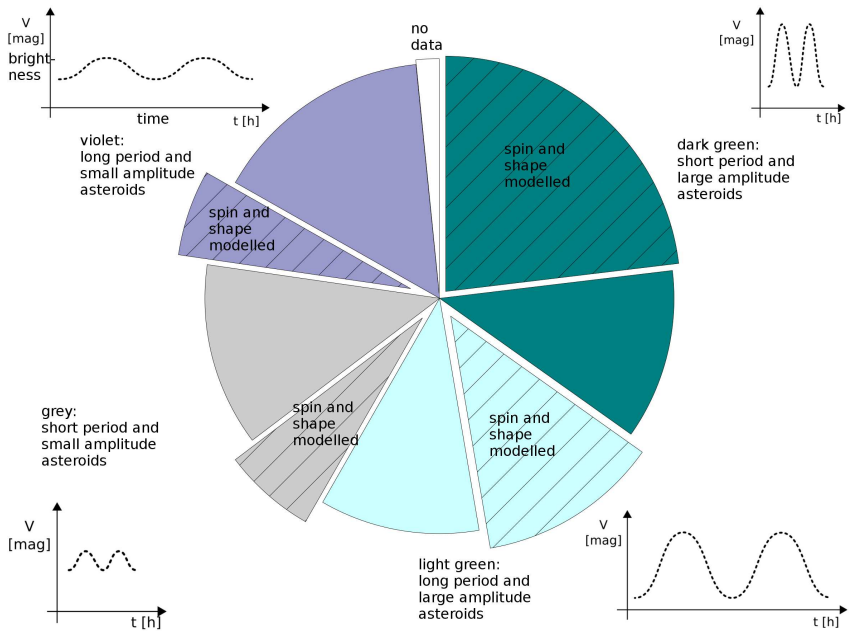
ESOP XLI, 10-11 September 2022, Granada

Slow rotators (aka. “Neglected Asteroids”) for occultation observations

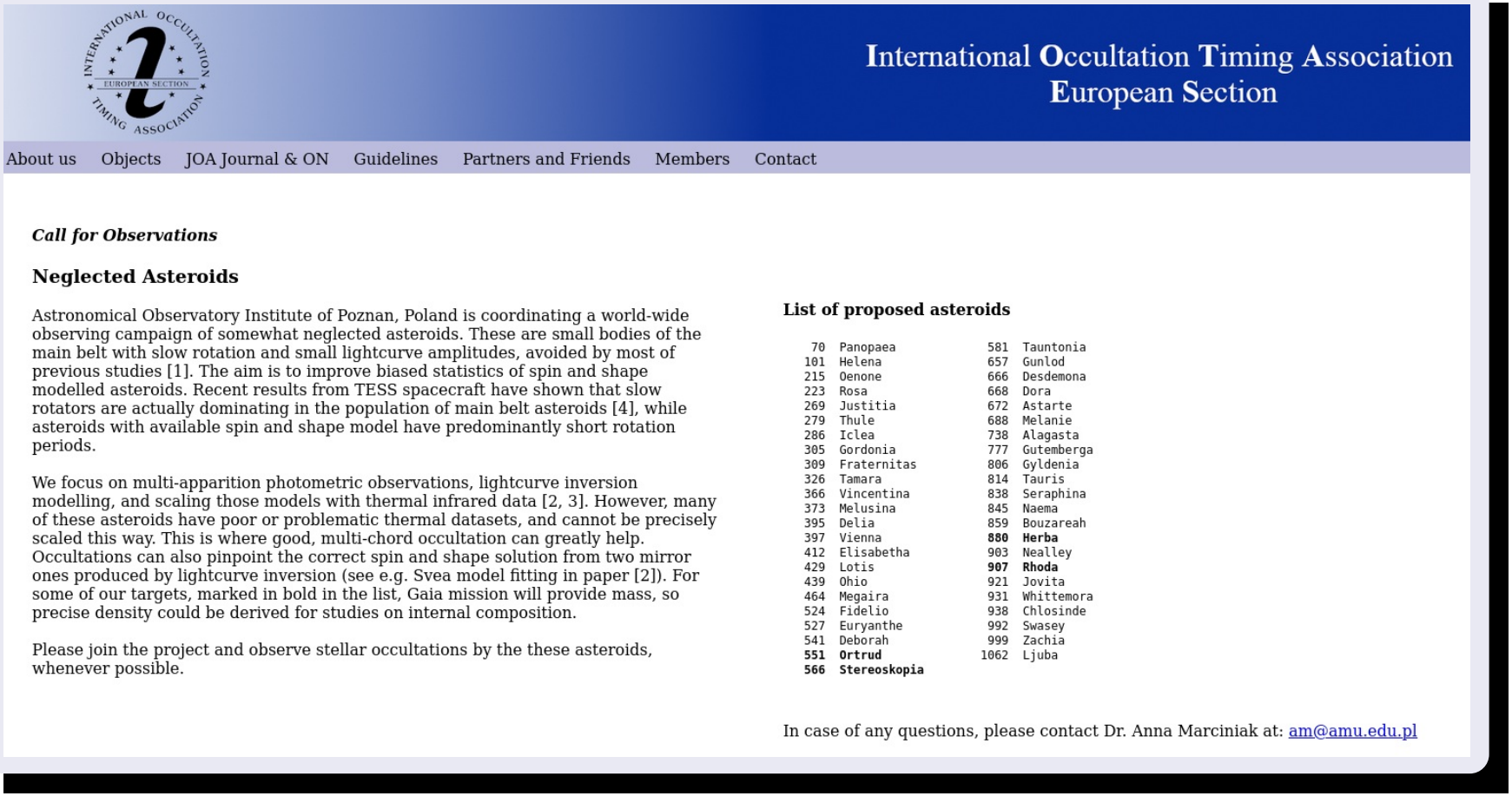
Previous list:

70 Panopaea	581 Tauntonia
101 Helena	657 Gunlod
215 Oenone	666 Desdemona
223 Rosa	668 Dora
269 Justitia	672 Astarte
279 Thule	688 Melanie
286 Iclea	738 Alagasta
305 Gordonia	777 Gutemberga
309 Fraternitas	806 Gyldenia
326 Tamara	814 Tauris
366 Vincentina	833 Monica
373 Melusina	838 Seraphina
395 Delia	845 Naema
397 Vienna	859 Bouzareah
412 Elisabetha	**880 Herba**
429 Lotis	903 Nealley
439 Ohio	**907 Rhoda**
464 Megaira	921 Jovita
524 Fidelio	931 Whittemora
527 Euryanthe	938 Chlosinde
541 Deborah	992 Swasey
551 Ortrud	999 Zachia
566 Stereoskopia	1062 Ljuba



IOTA/ES sub-page for “Neglected asteroids”

https://www.iota-es.de/neglected_asteroids.html



International Occultation Timing Association
European Section

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Call for Observations

Neglected Asteroids

Astronomical Observatory Institute of Poznan, Poland is coordinating a world-wide observing campaign of somewhat neglected asteroids. These are small bodies of the main belt with slow rotation and small lightcurve amplitudes, avoided by most of previous studies [1]. The aim is to improve biased statistics of spin and shape modelled asteroids. Recent results from TESS spacecraft have shown that slow rotators are actually dominating in the population of main belt asteroids [4], while asteroids with available spin and shape model have predominantly short rotation periods.

We focus on multi-apparition photometric observations, lightcurve inversion modelling, and scaling those models with thermal infrared data [2, 3]. However, many of these asteroids have poor or problematic thermal datasets, and cannot be precisely scaled this way. This is where good, multi-chord occultation can greatly help. Occultations can also pinpoint the correct spin and shape solution from two mirror ones produced by lightcurve inversion (see e.g. Svea model fitting in paper [2]). For some of our targets, marked in bold in the list, Gaia mission will provide mass, so precise density could be derived for studies on internal composition.

Please join the project and observe stellar occultations by the these asteroids, whenever possible.

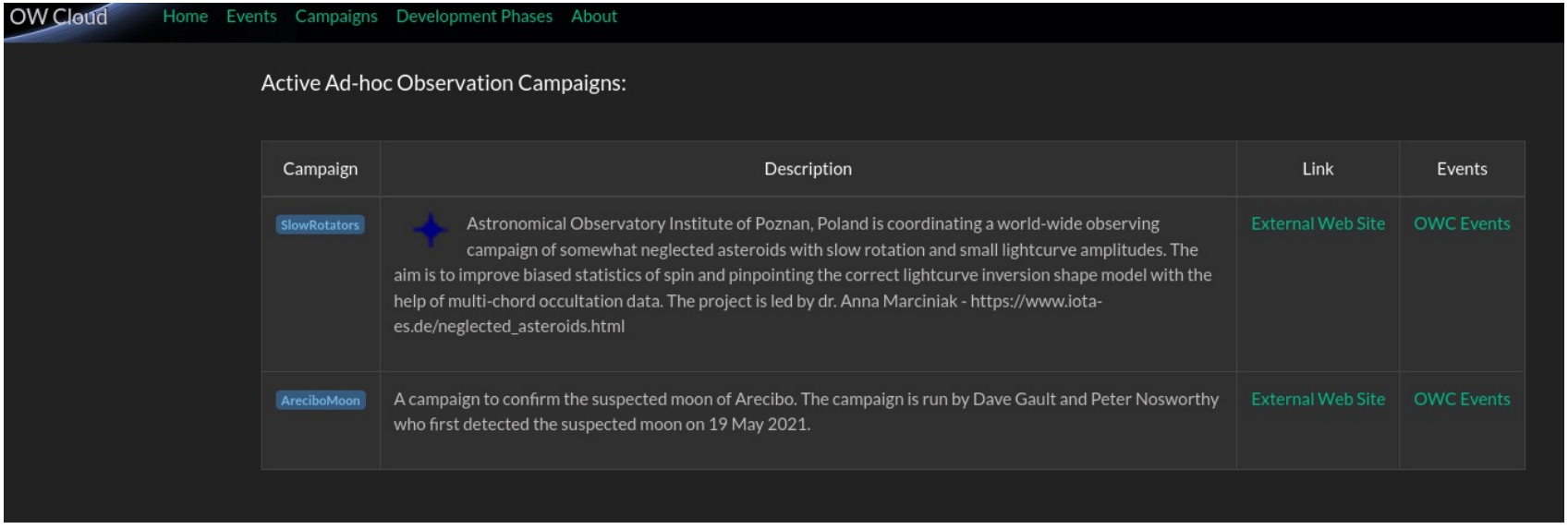
List of proposed asteroids

70	Panopaea	581	Tauntonia
101	Helena	657	Gunlod
215	Oenone	666	Desdemona
223	Rosa	668	Dora
269	Justitia	672	Astarte
279	Thule	688	Melanie
286	Iclea	738	Alagasta
305	Gordonia	777	Gutemberga
309	Fraternitas	806	Gyldenia
326	Tamara	814	Tauris
366	Vincentina	838	Seraphina
373	Melusina	845	Naema
395	Delia	859	Bouzareah
397	Vienna	**880**	**Herba**
412	Elisabetha	903	Nealley
429	Lotis	**907**	**Rhoda**
439	Ohio	921	Jovita
464	Megaira	931	Whittemora
524	Fidelio	938	Chlosinde
527	Euryanthe	992	Swasey
541	Deborah	999	Zachia
551	**Ortrud**	1062	Ljuba
566	**Stereoskopia**		

In case of any questions, please contact Dr. Anna Marciniak at: am@amu.edu.pl

Occult Watcher Cloud tag for Slow Rotators

https://cloud.occultwatcher.net/campaigns

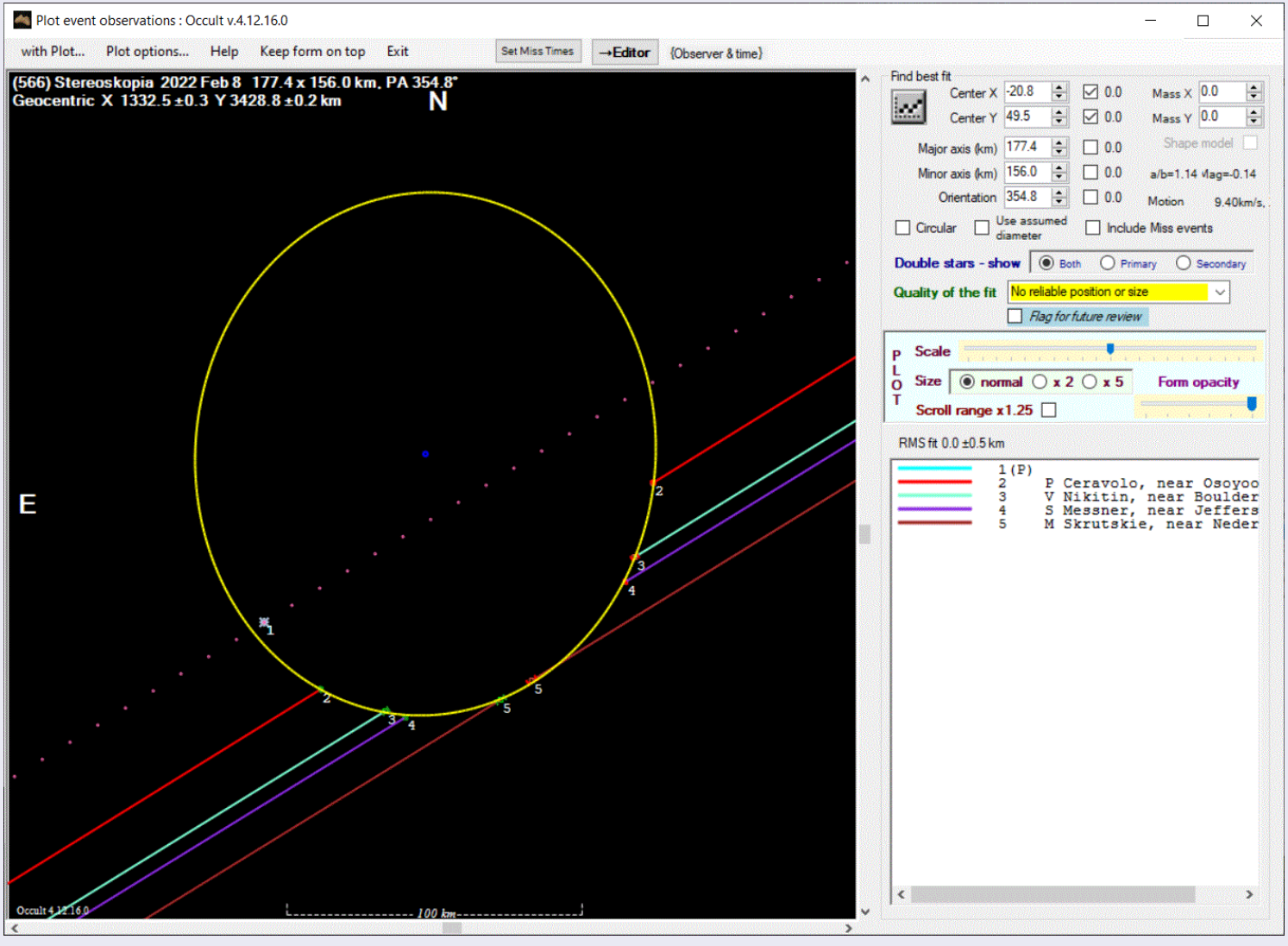


Occultations by Slow Rotators observed since September 2021

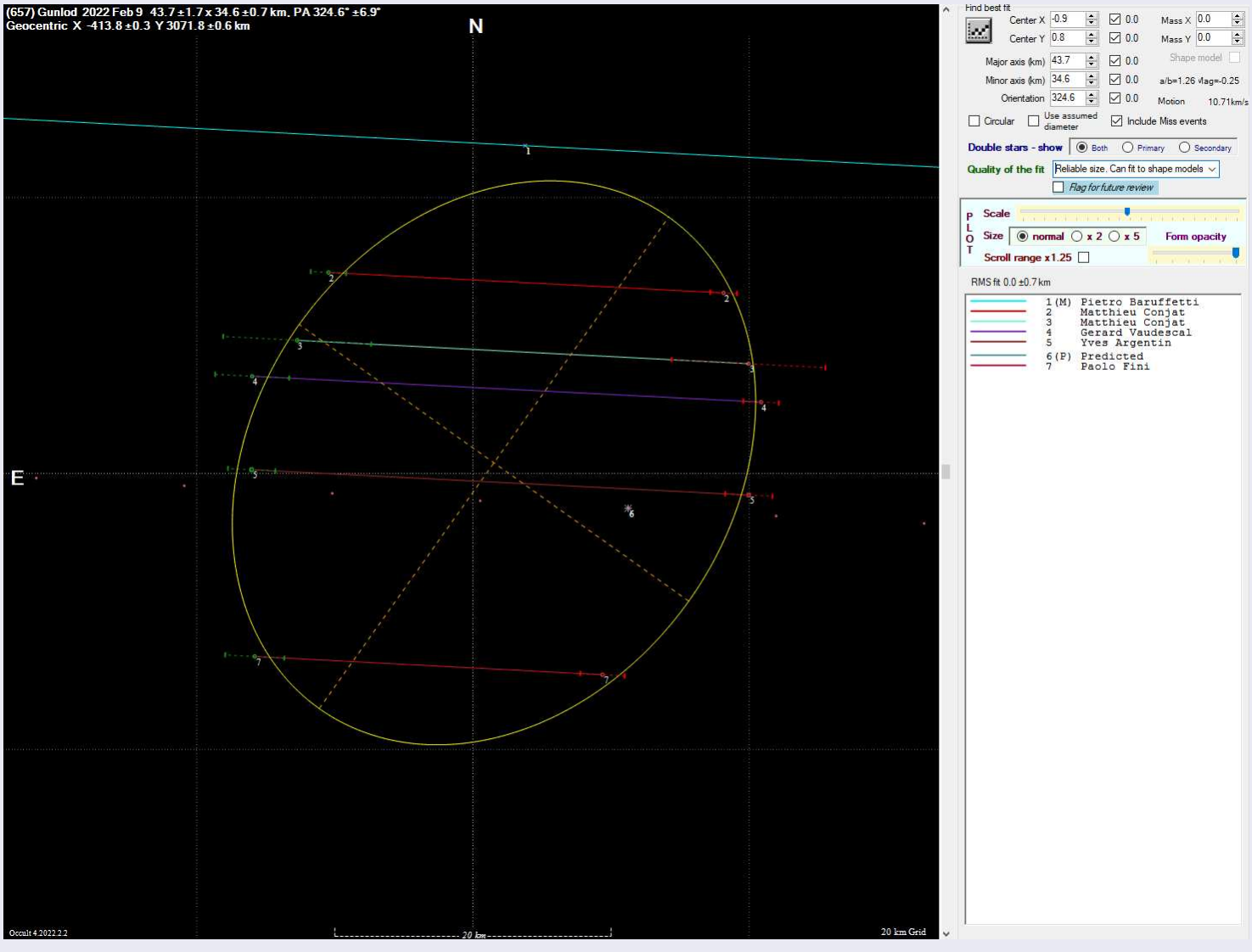
Month	Predicted events	Observed events	Highlights
September 2021	3	1	
October 2021	4	4	688 Melanie: 2 positive chords
November 2021	5	2	
December 2021	6	1	426 Hippo: 3 positive chords
January 2022	7	5	859 Bouzareah: 2 positives
			838 Seraphina: 2 positives
February 2022	10	5	999 Zachia: 2 positives
			566 Stereoskopia: **4 positives, incl. 1 graze**
			675 Gunlod: **5 positives**
March 2022	8	4	439 Ohio: **6 and 9 positives**
			426 Hippo: 3 positives
April 2022	5	0	
May 2022	4	2	581 Tauntonia: 2 positives
June 2022	3	3	903 Nealley: 2 positives
July 2022	4	2	
August 2022	5	1	

Summary: 30 events observed, 6 with multiple positive chords.

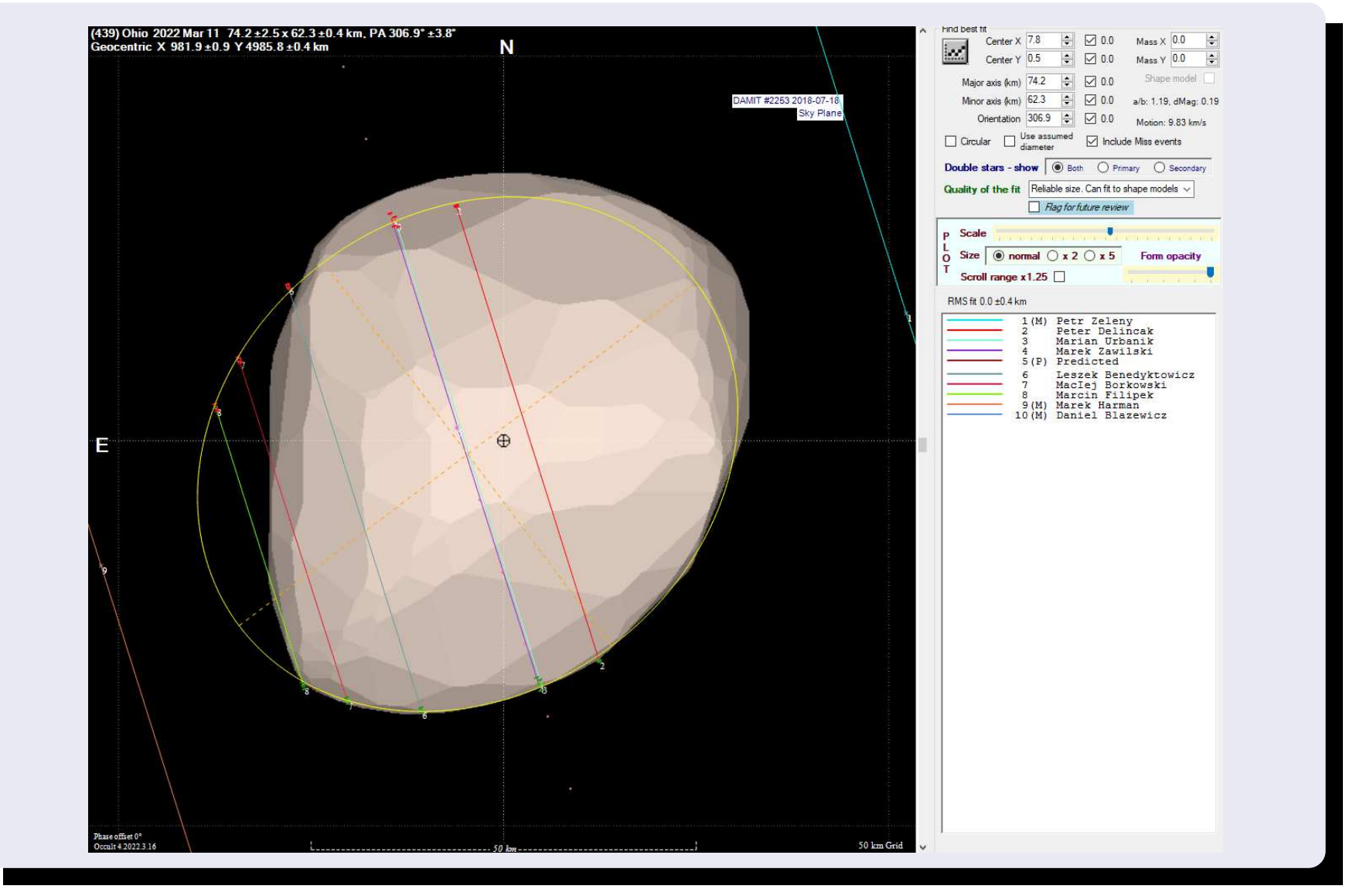
566 Stereoskopia event, 8 February 2022



657 Gunlod event, 9 February 2022

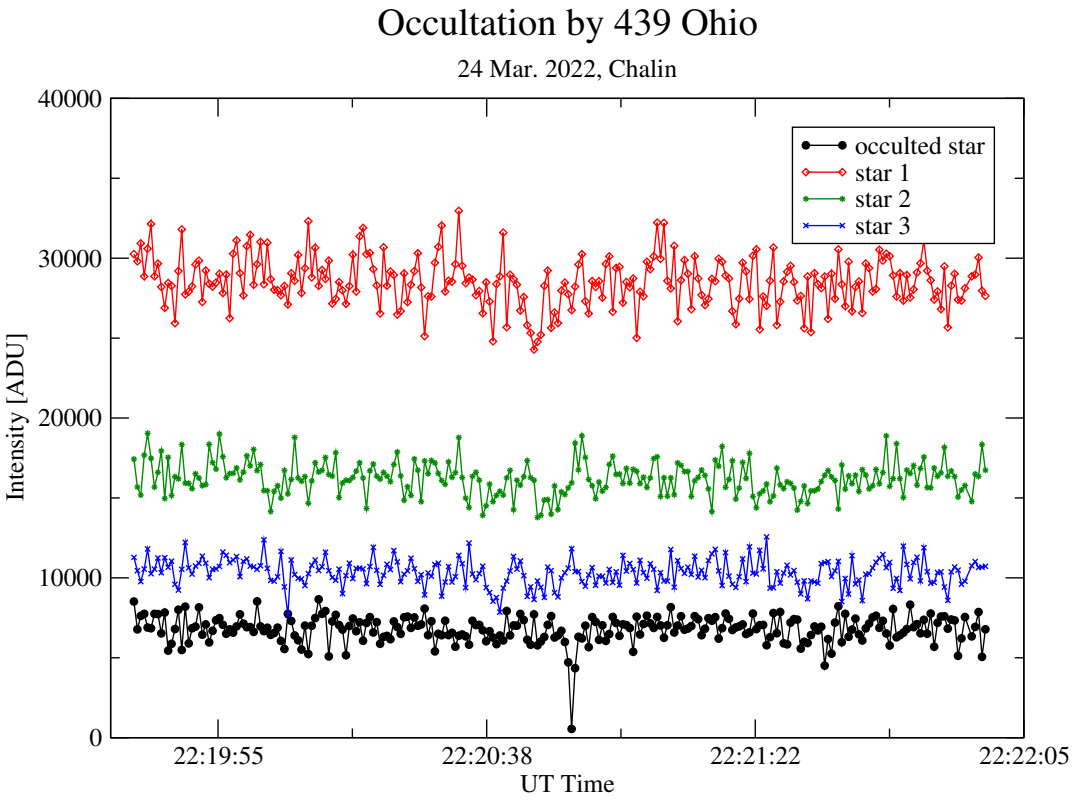


439 Ohio event, 11 March 2022



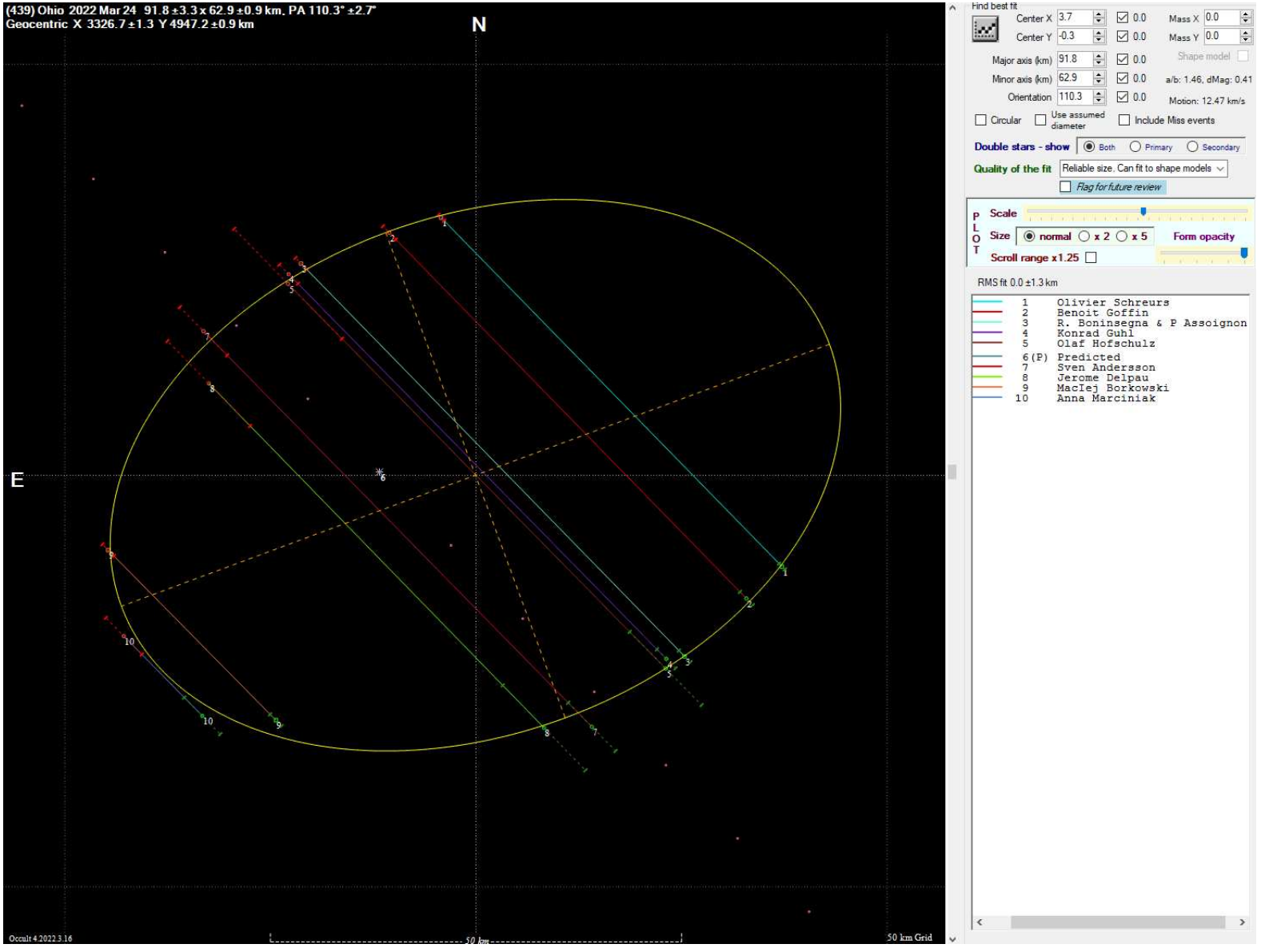
http://euraster.net, Ďurech et al. 2018

Ohio grazing event, 24 March 2022

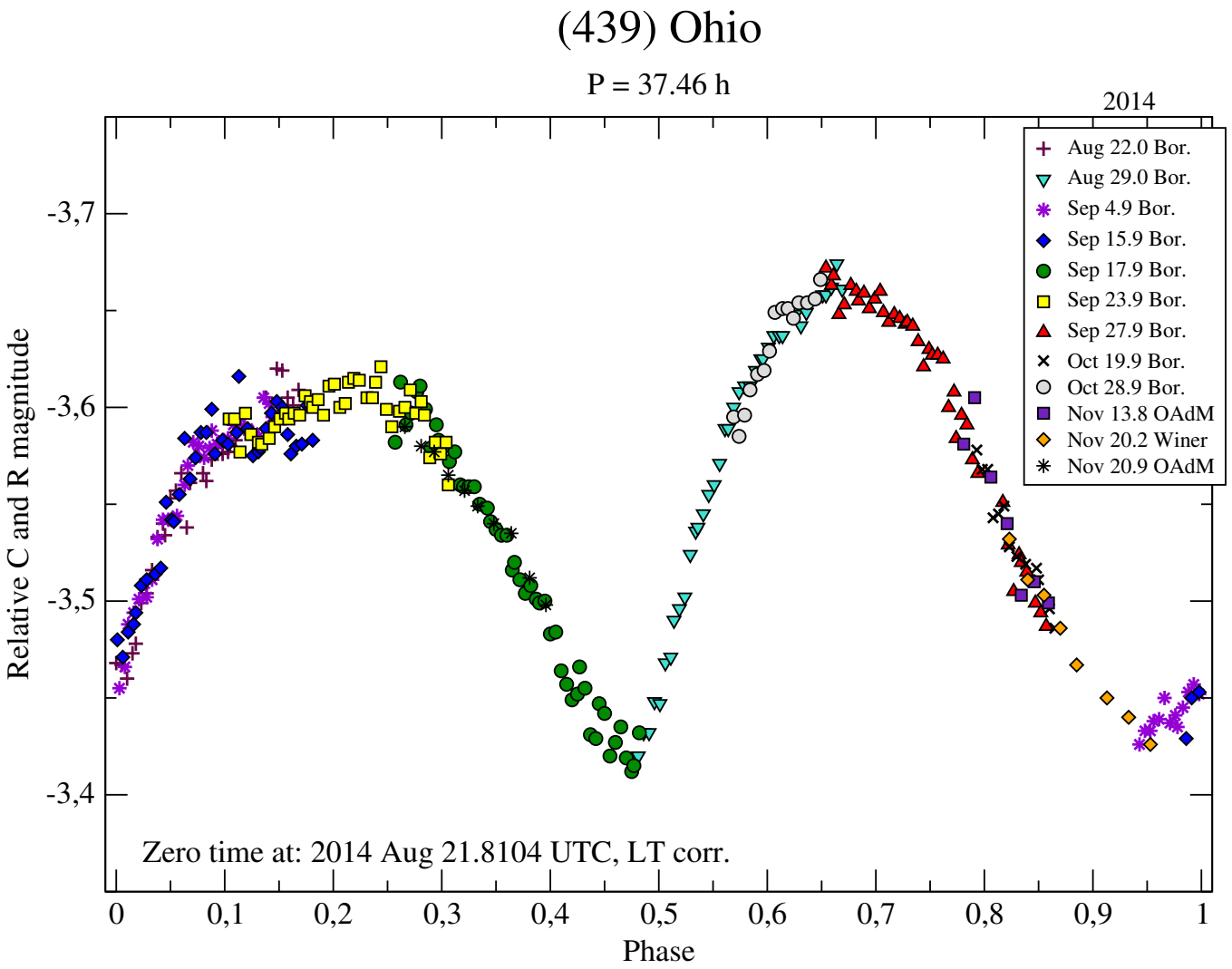


Occultation of 12.6 mag star by (439) Ohio (”Slow rotator”).
Predicted max duration: 5.6 s. Only one point in full occultation, plus two slightly dimmed points. Duration: 1.09 ± 0.35 s

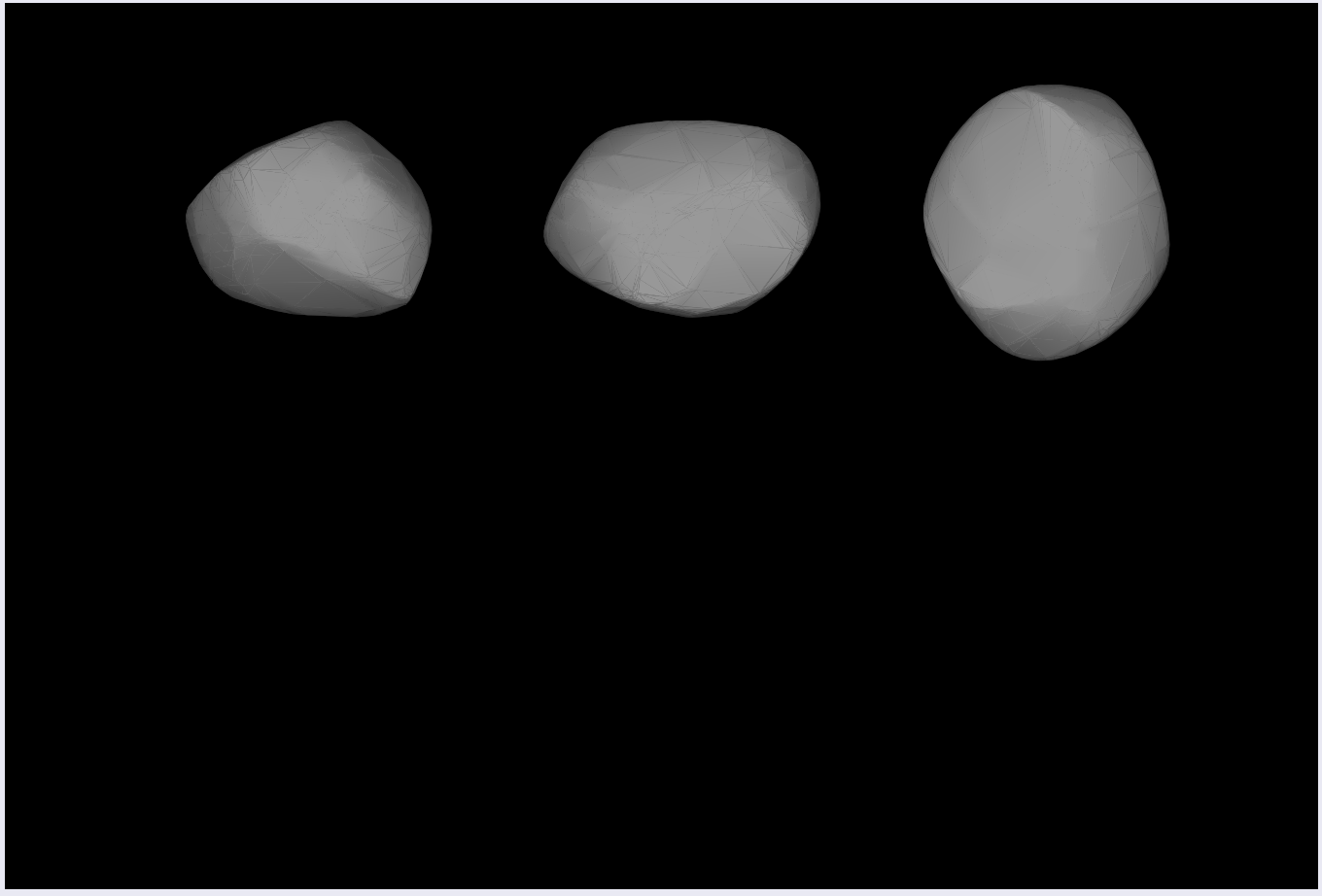
The most succesful occultation event for a slow rotator



Lightcurve of (439) Ohio

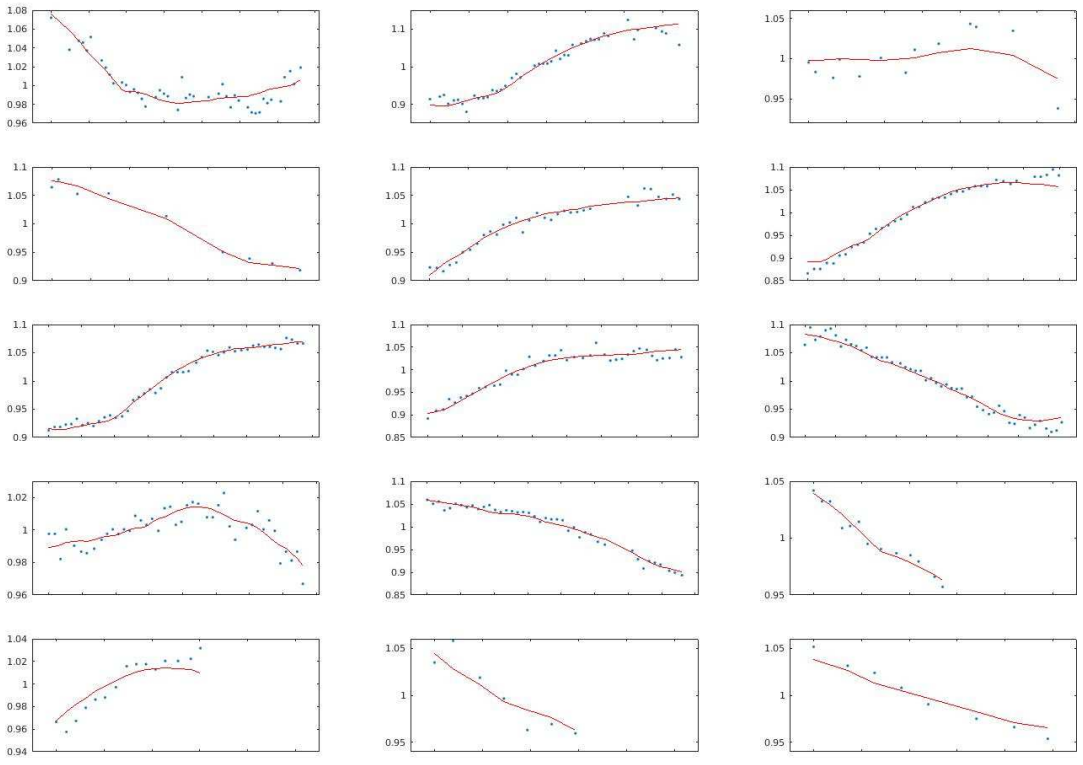


Lightcurve inversion model of (439) Ohio

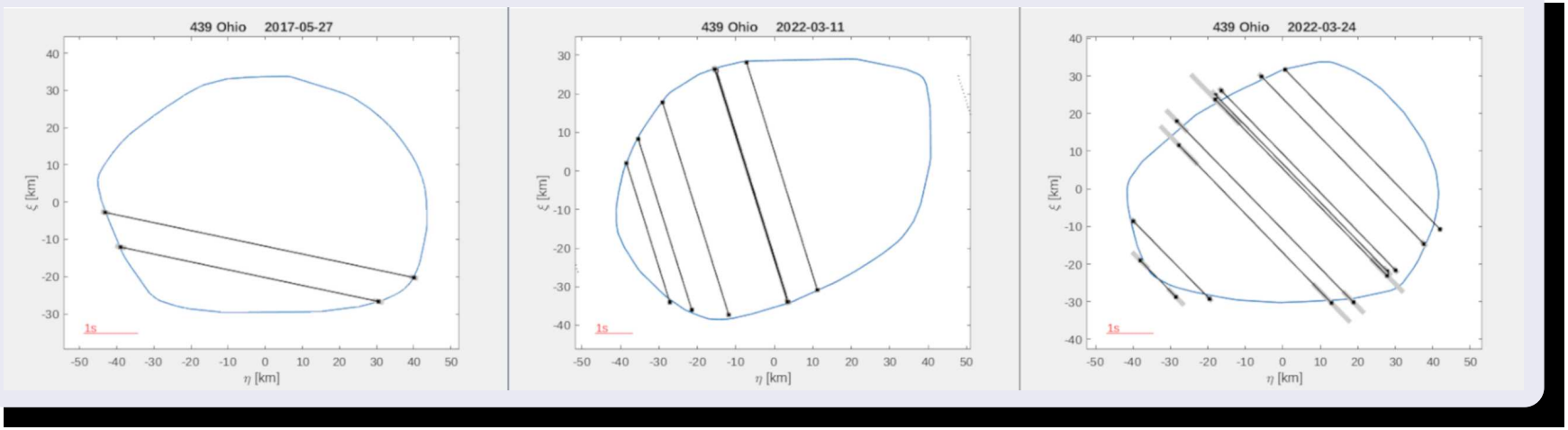


$P = 37.46726 \pm 0.00005$ h; rms $= 0.0123$ mag
$\lambda_p = 308° \pm 50°$
$\beta_p = -61° \pm 7°$

Observed lighcturves of (439) Ohio fitted by the model (selection)

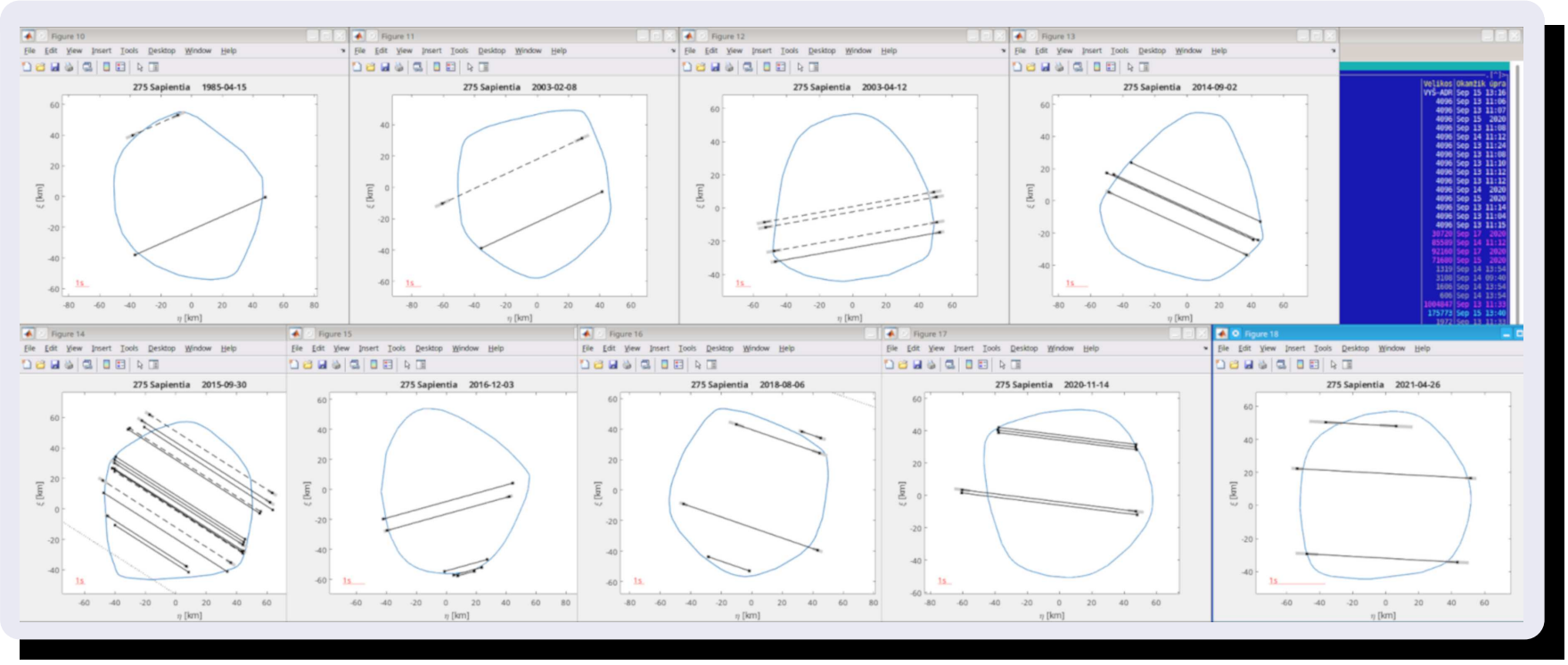


(439) Ohio model fit to occultations

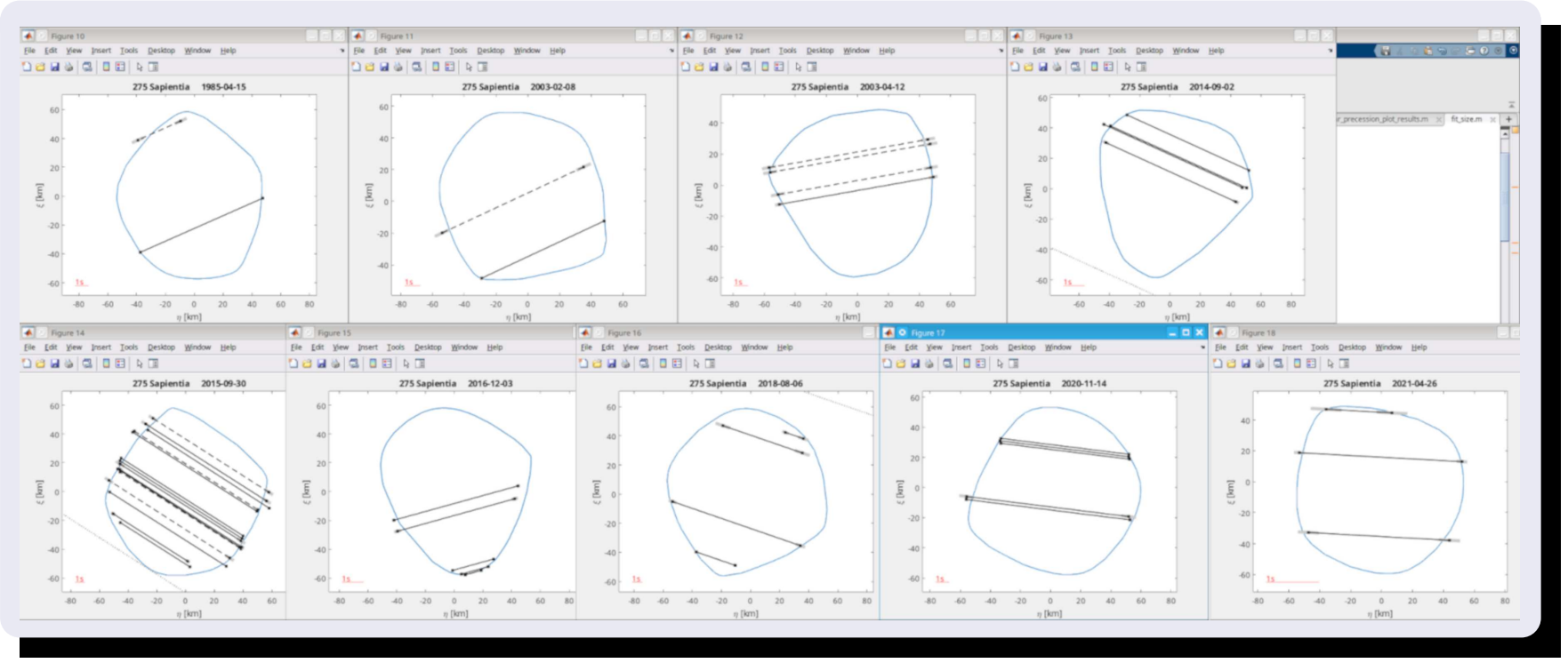


Volume equivalent size: 74 ± 2 km.

(275) Sapientia, rejected spin and shape solution

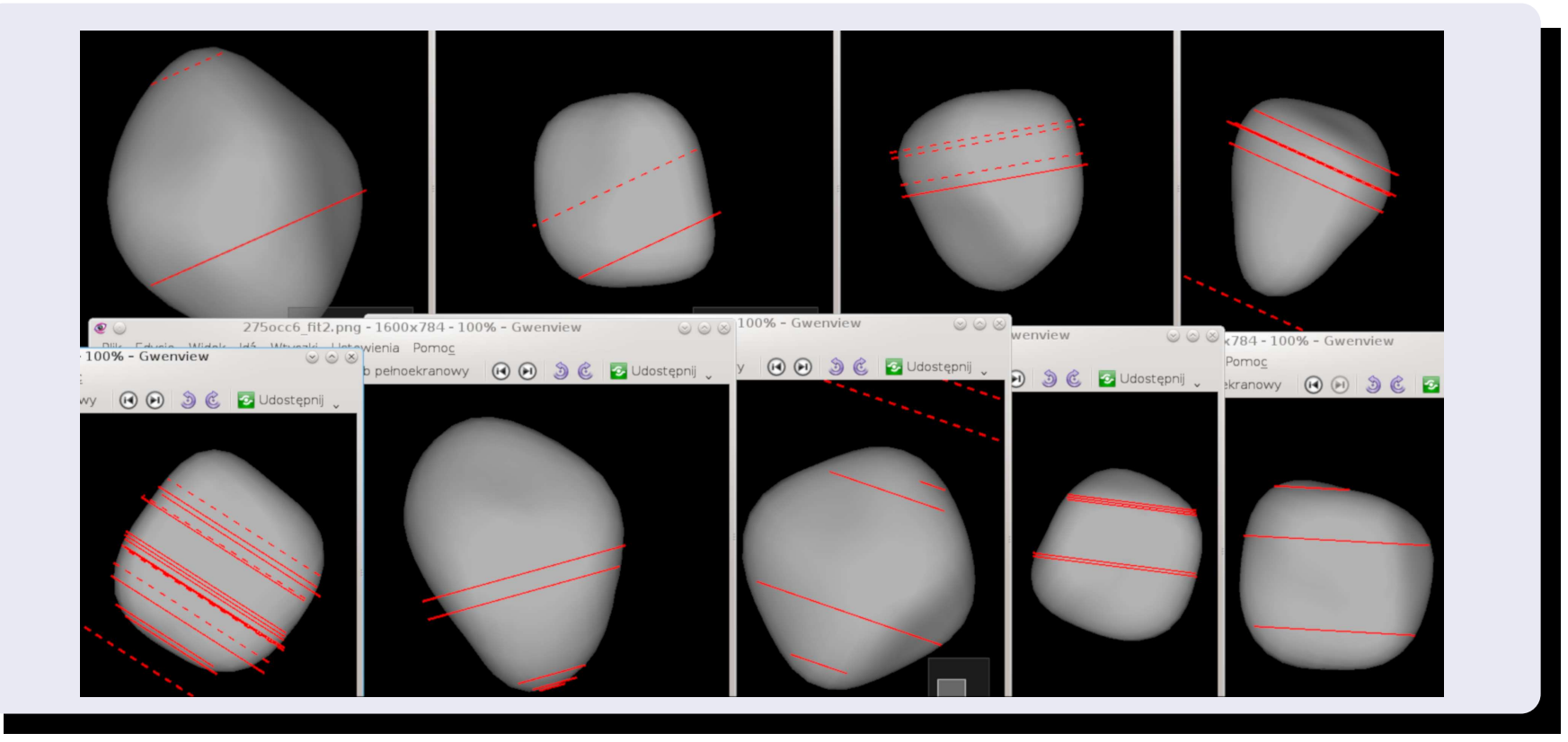


(275) Sapientia, confirmed spin and shape solution



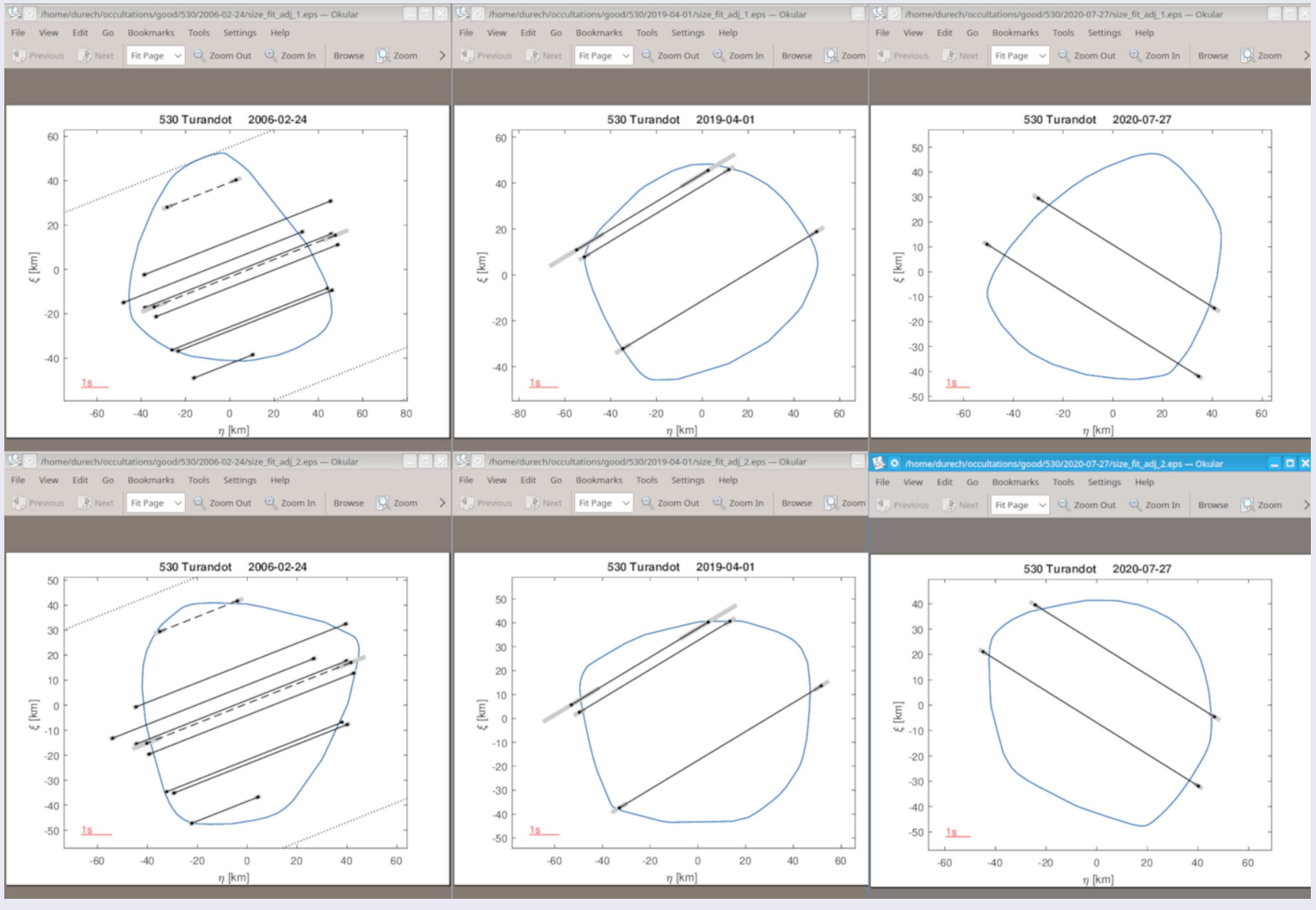
Volume equivalent size: 103 ± 6 km.

(275) Sapientia, ADAM spin and shape solution



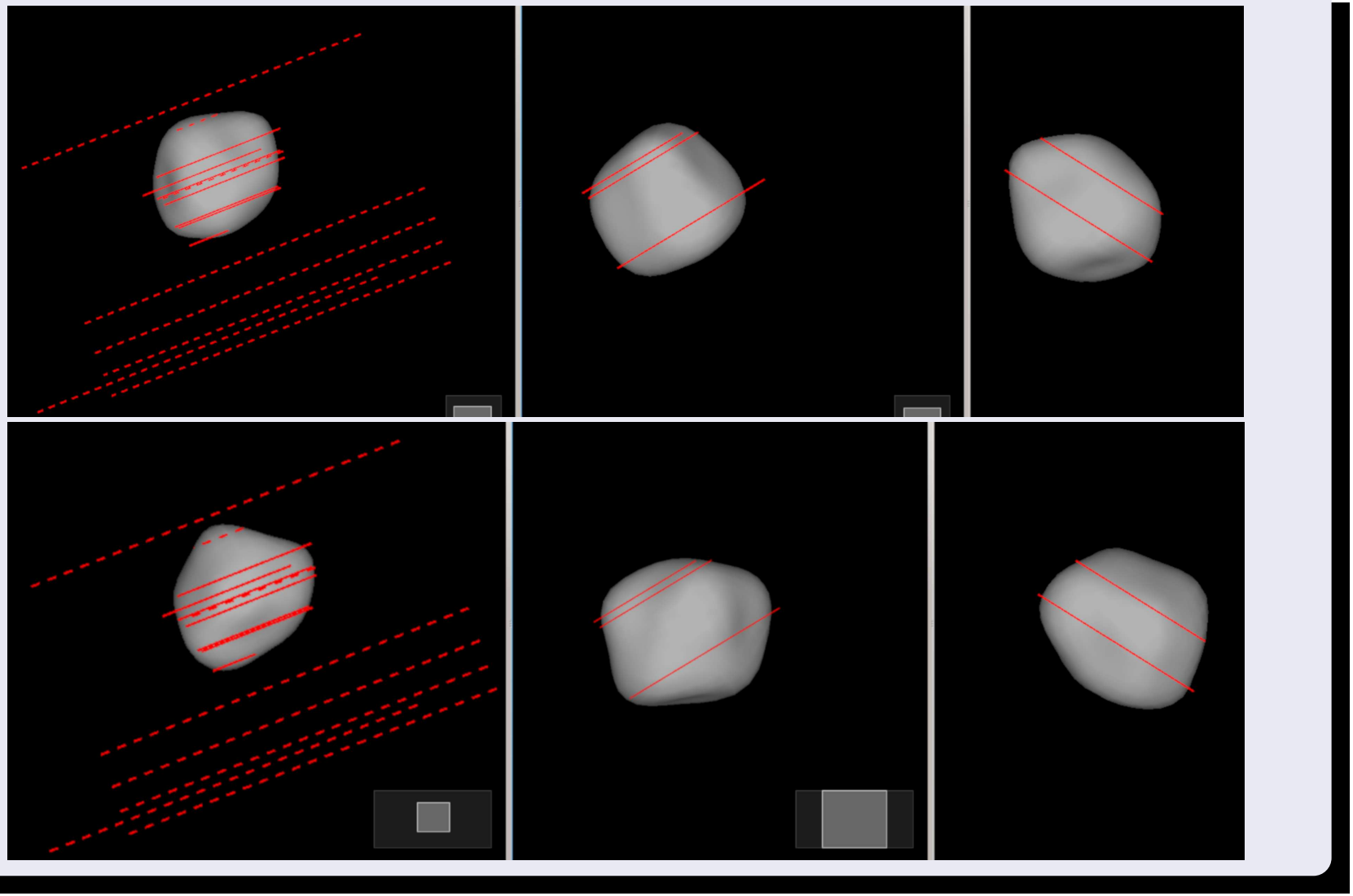
Volume equivalent size: 100 ± 1 km.

(524) Turandot, both spin and shape solutions



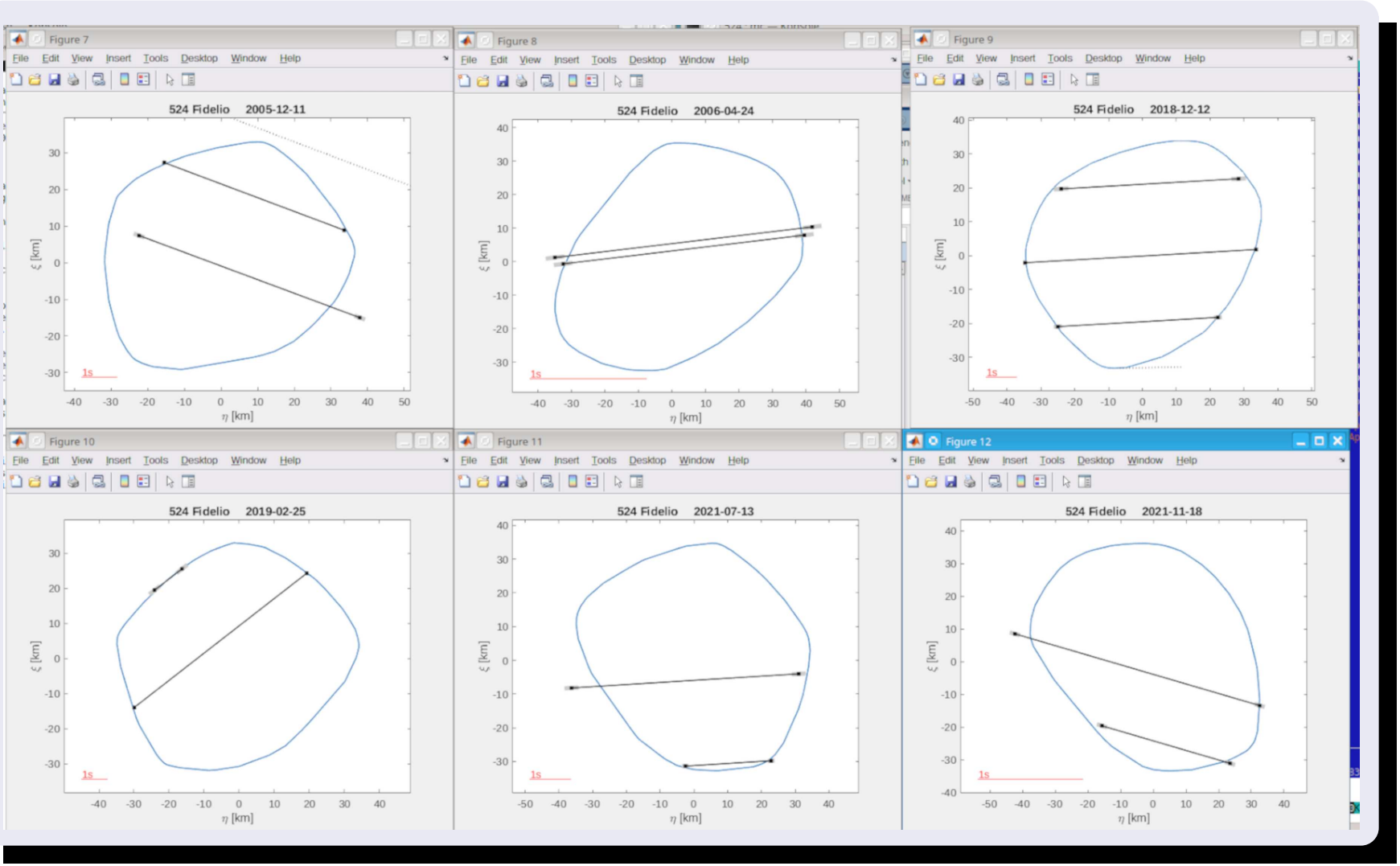
Volume equivalent size: 89 $\pm$ 3 km.

(530) Turandot, ADAM spin and shape solutions



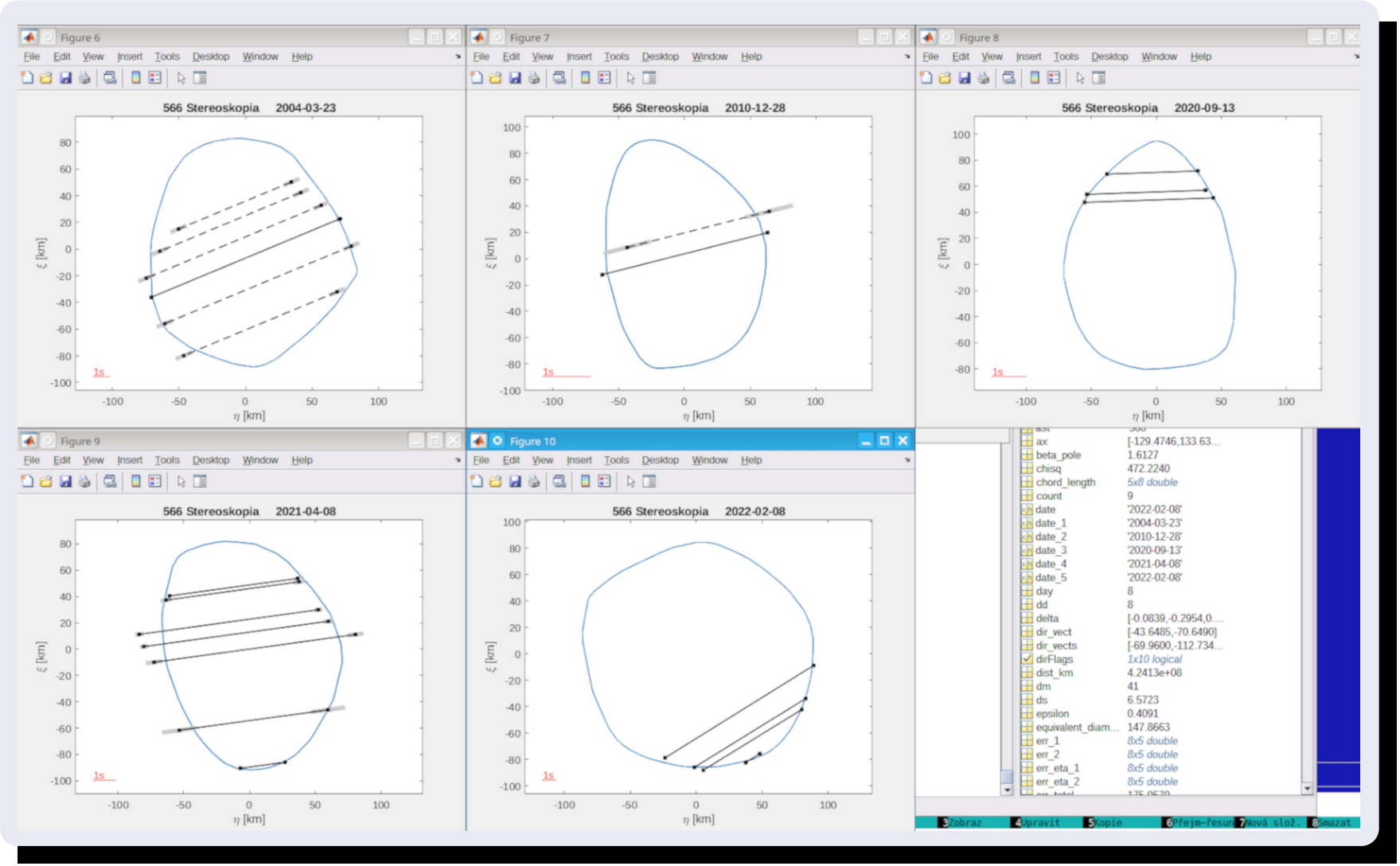
Volume equivalent size: 89 $\pm$ 2 km.

(524) Fidelio, confirmed spin and shape solution



Volume equivalent size: 67 ± 3 km.

(566) Stereoskopia, confirmed spin and shape solution



Volume equivalent size: 148 $\pm$ 8 km.

Observers of slow rotators occultation events

(275) Sapientia, 2020-11-14

G. Vaudescal	FR
E. Frappa & A. Klotz	FR
M. Conjat	FR
A. Manna	CH
S. Sposetti	CH
G. Casalnuovo	IT
A. Kreutzer &	AT
M. Billiani	FR

(275) Sapientia, 2021-04-26

T. George	Scotsdale, AZ
P. Stuart	Clear Lake. TX
S. Brazill	Georgetown, TX

(439) Ohio, 2022-03-11

P. Zeleny	CZ
P. Delincak	SK
M. Urbanik	SK
M. Zawilski	PL
L. Benedyktowicz	PL
M. Borkowski	PL
M. Filipek	PL
M. Harman	SK
D. Błażewicz	PL

(439) Ohio, 2022-03-24

O. Schreurs	BE
B. Goffin	BE
R. Boninsegna & P. Assoignon	BE
K. Guhl	DE
O. Hofschulz	DE
S. Anderson	DE
J. Delpau	FR
M. Borkowski	PL
A. Marciniak	PL

(524) Fidelio, 2021-07-13

J. Newman	Flynn, Act, AU
W. Hanna	Yass, Nsw, AU

(524) Fidelio, 2021-11-18

R. Venable	Chester, GA
R. Venable	Tarversville, GA

(566) Stereoskopia, 2021-04-08

B. Kattentidt	DE
R. Boninsegna	BE
B. Gaehrken	DE
G. Krannich	DE
W. Hausbick	DE
M. Simon	DE
K.-L. Bath	DE
S. Meister	CH

(566) Stereoskopia, 2022-02-08

P. Ceravolo	Osoyoos, CAN
V. Nikitin	Boulder, CO
S. Messner	Jefferson, TX
M. Skrutskie	Nederland, CO

(657) Gunlod, 2022-02-09

P. Barufetti	IT
M. Conjat	FR
M. Conjat	FR
G. Vaudescal	FR
Y. Argentin	FR
P. Fini	IT

Slow rotators (aka. “Neglected Asteroids”) for occultation observations

Recent changes to the list.
Modelled and scaled asteroids go out:

70 Panopaea	581 Tauntonia
101 Helena	657 Gunlod
215 Oenone	666 Desdemona
223 Rosa	668 Dora
269 Justitia	672 Astarte
279 Thule	688 Melanie
286 Iclea	738 Alagasta
305 Gordonia	777 Gutemberga
309 Fraternitas	806 Gyldenia
326 Tamara	814 Tauris
366 Vincentina	833 Monica
373 Melusina	838 Seraphina
395 Delia	845 Naema
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541 Deborah	992 Swasey
551 Ortrud	999 Zachia
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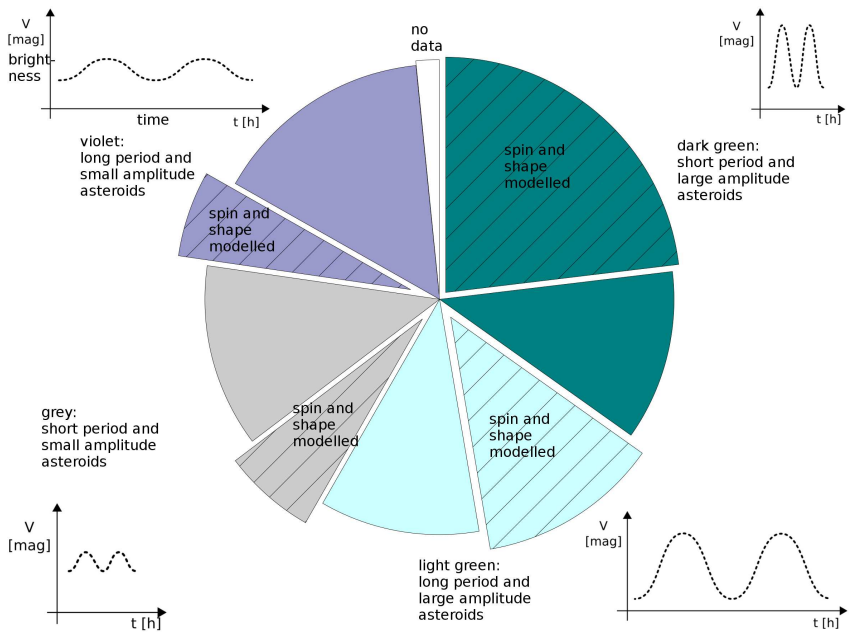
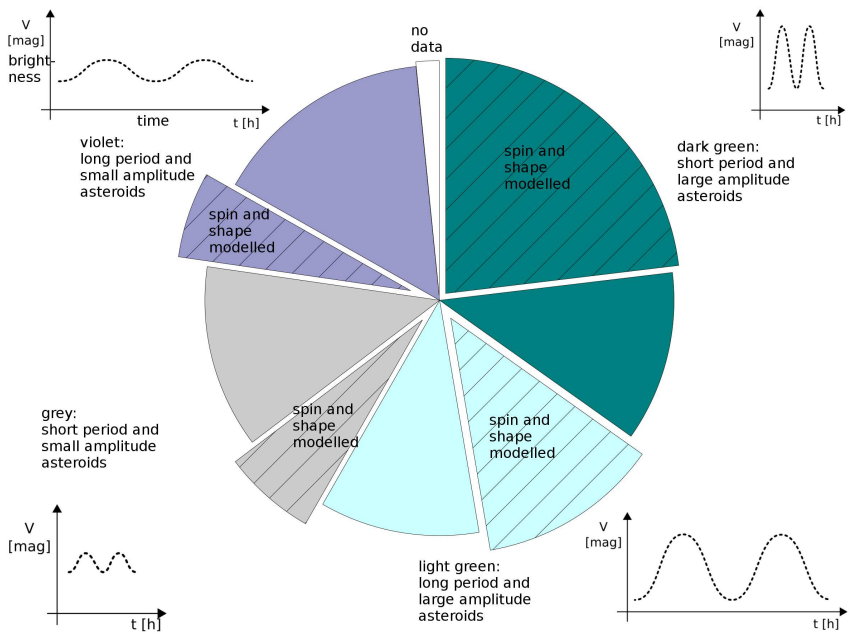


Slow rotators (aka. “Neglected Asteroids”) for occultation observations

Recent changes to the list.
New additions:

49 Pales	554 Peraga
57 Mnemosyne	581 Tauntonia
101 Helena	657 Gunlod
144 Vibilia	668 Dora
185 Eunike	672 Astarte
200 Dynamene	688 Melanie
215 Oenone	777 Gutemberga
248 Lameia	814 Tauris
269 Justitia	833 Monica
279 Thule	838 Seraphina
305 Gordonia	845 Naema
309 Fraternitas	858 El Djezair
375 Ninina	859 Bouzareah
366 Vincentina	877 Valkure
373 Melusina	880 Herba
393 Lampetia	903 Nealley
395 Delia	907 Rhoda
397 Vienna	921 Jovita
407 Arachne	931 Whittemora
426 Hippo	938 Chlosinde
429 Lotis	992 Swasey
491 Carina	999 Zachia
527 Euryanthe	1062 Ljuba
541 Deborah	1269 Rollandia



Summary

- Slow rotators campaign is spreading.
- Please keep joining the campaigns! OWC tag SlowRotators.
- 30 events observed since September 2021 in Europe and US, 6 with multiple positive chords.
- Ca. 15 slow rotators scaled by these and also archival occultations (A&A paper in preparation).
- One of the most successful campaigns: 439 Ohio, 6 and 9 positives, perfectly in line with the model.
- Slow rotators scaled here with accuracy of 1–5% (previous sizes uncertain by up to 30%).