Physical studies of NEOs at Poznan Observatory

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01 Feb 2016

Photometric observations of VSAs

- VSAs: Very Small Asteroids: D<150 m
- Photometry can help in studying their internal structure and evolution
- Questions to be answered:
  - What is the shortest rotation period? (so far $P > 23$ s)
  - How the spin limit depend on diameter?
  - Are there many NPA rotators?
  - What are spin axes and shapes of VSAs?

Telecsopes used in observations

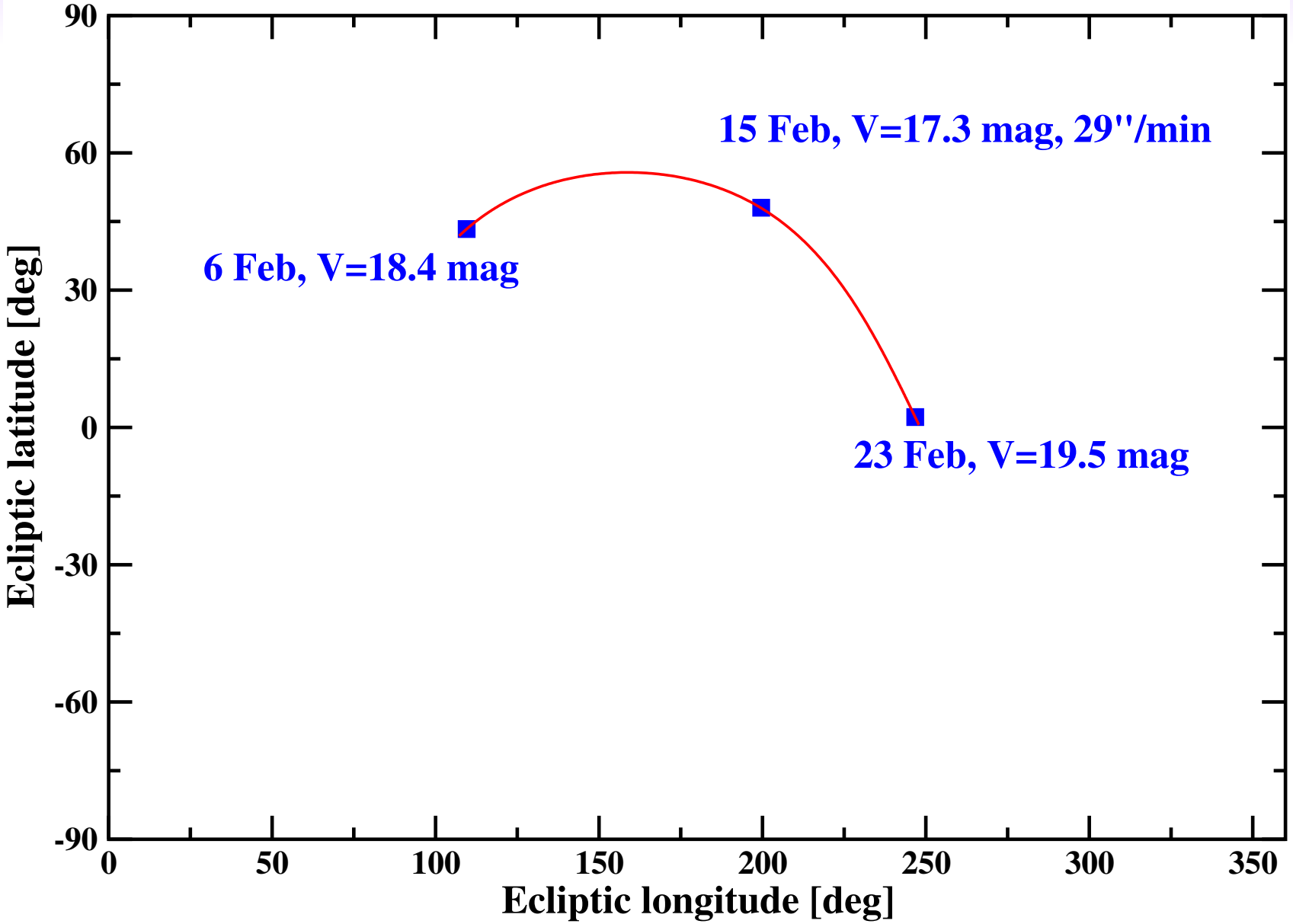
- 0.7-m RBT at Winer Observatory, Arizona
- 1.0-m and 2.0-m LCOGT (through EURONER project)
- 10.0-m SALT at SAAO, South Africa

Photometric survey with RBT and LCOGT (EURONEAR)

- Target selection: JPL *NEO Earth Close Approaches* table
- Conditions: $H > 23$ mag, $d < 10$ LU
- Observations from 23 Dec 2014 to 24 Sep 2015
- 29 objects, 87 lightcurves (22 RBT, 65 LCO), 138 hours

Object Name	Close Approach Date	CA Distance* (AU)	CA Distance* (LD)	Estimated Diameter**	H (mag)	Relative Velocity (km/s)
(2015 TC145)	2015-Oct-10	0.1117	43.5	54 m - 120 m	23.5	7.34
(2015 TN21)	2015-Oct-10	0.0060	2.3	10 m - 23 m	27.1	13.06
(2015 TG145)	2015-Oct-11	0.0944	36.8	33 m - 73 m	24.5	14.82
(2015 TB25)	2015-Oct-11	0.0244	9.5	34 m - 75 m	24.5	9.55
(2015 TK21)	2015-Oct-12	0.0123	4.8	15 m - 33 m	26.3	10.38
(2015 TG24)	2015-Oct-12	0.0103	4.0	11 m - 26 m	26.8	9.62
420738 (2012 TS)	2015-Oct-12	0.1466	57.1	180 m - 410 m	20.8	8.67
(2015 TC25)	2015-Oct-13	0.0007	0.3	3.3 m - 7.4 m	29.5	4.43
(2015 TD24)	2015-Oct-13	0.1069	41.6	23 m - 51 m	25.3	9.24
401885 (2001 RV17)	2015-Oct-13	0.1559	60.7	210 m - 470 m	20.5	7.67

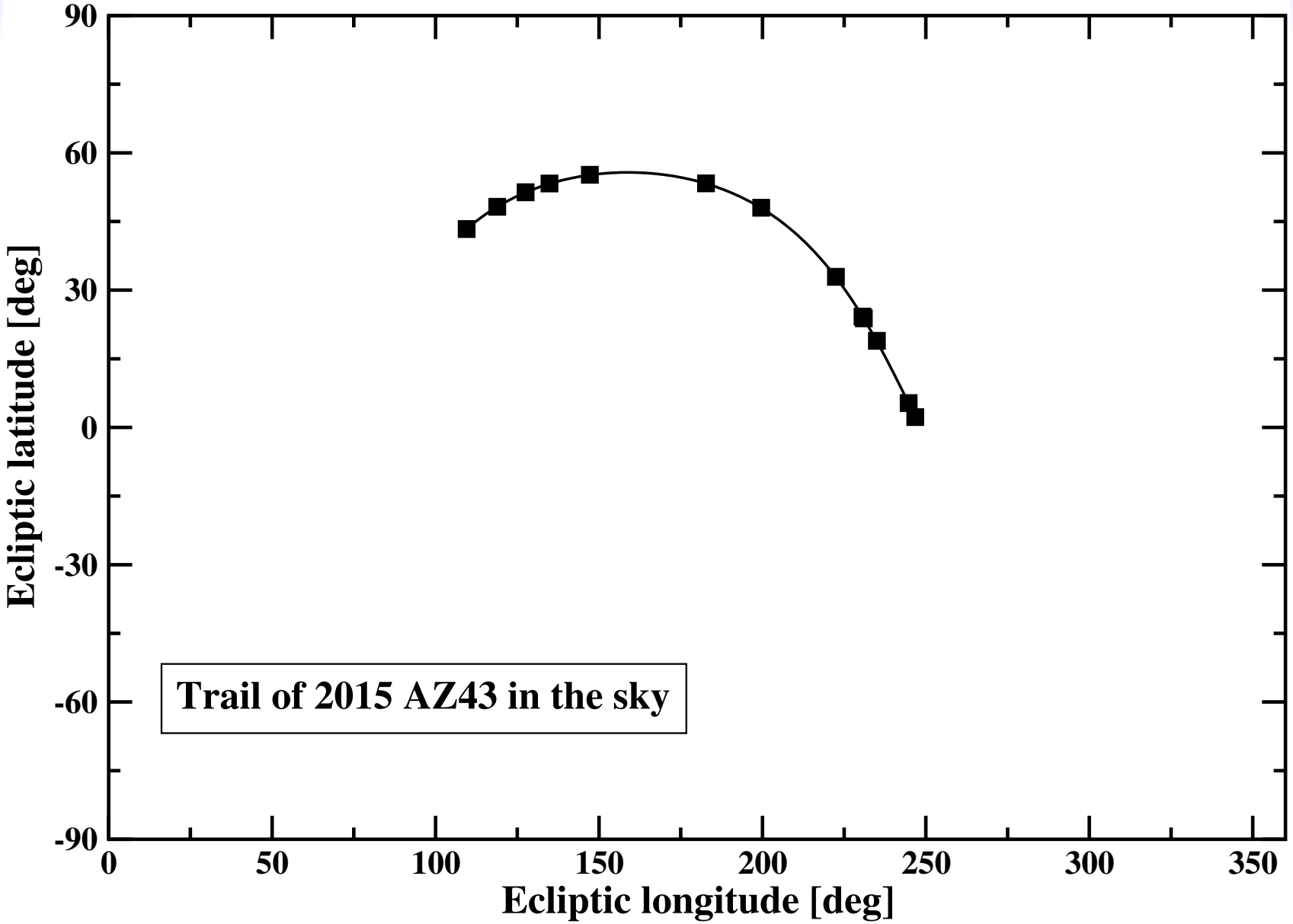
Example: observations of 2015 AZ43 in Feb 2015



2015 AZ43 observing campaign

- Duration: 6 – 23 Feb 2015
- Objective: period, spin axis, shape, taxonomy
- Observers:
  - 2.5-m NOT: Oszkiewicz, Kwiatkowski, Pentila,
  - 1.0-m LCOGT: Kwiatkowski, Unda-Sanzana
  - 2.0-m LCOGT: Kwiatkowski, Vaduvescu
  - 0.7-m RBT: Kwiatkowski, Kamiński, Fagas
  - 2.4-m Magdalena Ridge: Ryan
  - 4.0-m Mayall: Moskovitz, Thirouin
  - 1.5-m Danish: Pravec
- Independently observed by B. Warner (14, 15 Feb)

2015 AZ43: 10 lightcurves observed



2015 AZ43: period, spin axis and 3D shape (preliminary)

- Effective diameter: 60 m
- Rotation period: 0.6 h
- Spin axis: $\lambda = 281°, \beta = -35°$
- Non-convex shape: see animations