

Summary

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Assumptions

Discovered 24/09/1973 at Berne observatory by Paul Wild Semi-major axis: 2.435UA Orbital eccentricity: 0.0895 Orbital inclination: 14.793° Diameter: 12.6 Km

This minor planet is reported on Minor Planet Bulletin n. 40-2 with period = 7.88 hours, amplitude = 0.24 Mag. and quality code 1

Initial data

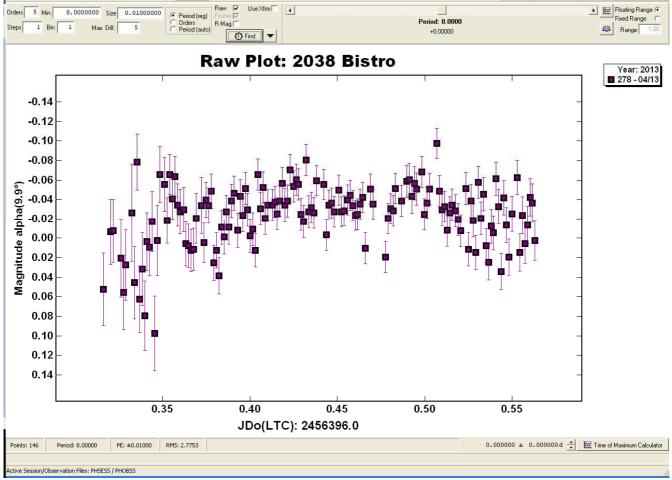
Analysis was done with measurement taken between 13/04/2013 and 04/05/2013. Observations cover 21 days span. These sessions was included

Bassano Bresciano Observatory

2038 Bistro rotation time find out

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Refs: 10 Offset: -22.150 SD: 0.037 Sess: 278



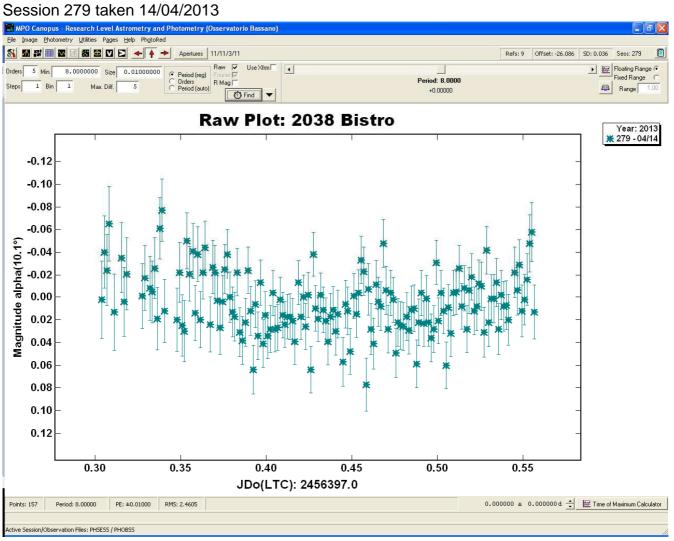
146 points in 5:00 hours

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2038 Bistro rotation time find out

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May 2013



157 points in 5:00 hours

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Research Level Astro age Photometry Utilities Pages Help PhotoP 🚮 🔤 📰 🎟 🐼 🔀 😫 💟 🖸 🔶 🔺 🔶 Apertures 11/11/3/11 Refs: 10 Offset: -25.713 SD: 0.161 Sess: 280 Use Xfrm 🕨 🔤 Floating Range 🙃 Raw 🔽 Fourier 🔽 Period (reg) Orders Period (auto) Orders 5 Min. 8.0000000 Size 0.01000000 Fixed Range Period: 8.0000 R Mag 1 Bin 1 Steps Max. Diff. 5 +0.00000 (A) Range Find V **Raw Plot: 2038 Bistro** Year: 2013 ■ 280 - 04/15 -0.14 -0.12 -0.10 -0.08 -0.06 Magnitude alpha(10.4°) -0.04 -0.02 0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.14 0.35 0.30 0.40 0.45 JDo(LTC): 2456398.0 0.000000 ± 0.000000 d 🛫 🔤 Time of Maximum Calculator Points: 106 Period: 8.00000 PE: ±0.01000 RMS: 3.6436

106 points in 4:00 hours

ctive Session/Observation Files: PHSESS / PHOBSS

Sessions 280 taken 15/04/2013

May 2013

2038 Bistro rotation time find out

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Sessions 281 taken 17/04/2013 Research Level Astro etry and Image Photometry Utilities Pages Help PhotoRe 🚮 🌆 📰 🎟 🔯 👪 🕸 💟 🔁 🔶 🔺 🔶 Apertures 11/11/3/11 Refs: 10 Offset: -25.579 SD: 0.090 Sess: 281 Raw 🔽 Fourier 🖂 Floating Range 🕫 Use Xfrm Period (reg) Orders Period (auto) Orders 5 Min 8.0000000 Size 0.01000000 ____ Period: 8.0000 Fixed Range R Mag 1 Bin Steps 1 Max. Diff. 5 +0.00000 63 Range Tind V **Raw Plot: 2038 Bistro** Year: 2013 281 - 04/17 -0.12 -0.10 -0.08 -0.06 Magnitude alpha(10.8°) -0.04 -0.02 0.00 0.02 0.04 0.06 0.08 0.10 0.12 0.40 0.35 0.45 0.50 0.55 JDo(LTC): 2456400.0 0.000000 ± 0.000000 d 🛫 🔤 Time of Maximum Calculator Points: 118 Period: 8.00000 PE: ±0.01000 RMS: 2.9250 2013/04/15 @ 23:24:11 JD (LT) := 2456398.4673 Session: 280 IM: -6.731 DM: 14.847 RM: 12.367 ctive Sess/Obs Files: PHSESS / PHOBS

118 points in 4:50 hours

2038 Bistro rotation time find out

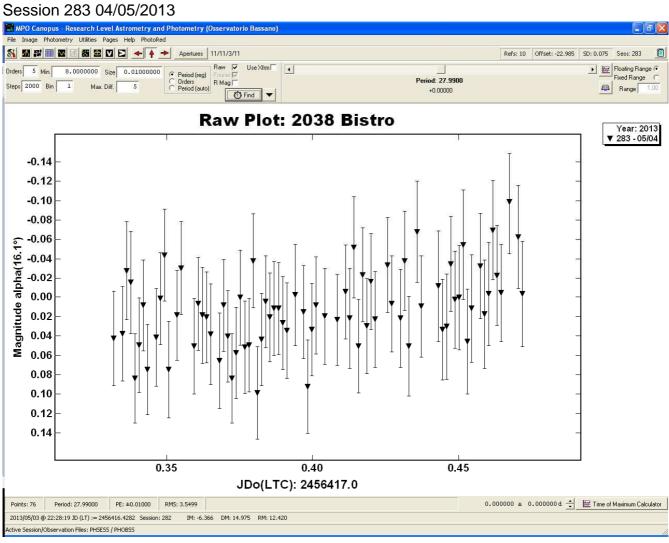
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Sessions 282 taken 03/05/2013 - Research Level Astrometry and Image Photometry Utilities Pages Help PhotoRec 🚮 📓 📰 🗰 🐼 🗟 💟 🗗 🔶 🔶 Apertures 11/11/3/11 Refs: 10 Offset: -25.879 SD: 0.118 Sess: 282 Raw 🔽 Fourier 🔽 Use Xfrm Floating Range 🤅 Period (reg) Orders Period (auto) Orders 5 Min. 8.0000000 Size 0.01000000 ____ Period: 27.9900 Fixed Range Steps 2000 Bin 1 Max. Diff. 5 63 +0.00000 Range Find V **Raw Plot: 2038 Bistro** Year: 2013 282 - 05/03 -0.10 -0.08 -0.06 Magnitude alpha(15.7°) 0000 000 7000 000 7000 000 0.06 0.08 0.10 0.40 0.35 JDo(LTC): 2456416.0 0.000000 ± 0.000000 d 🛫 🔤 Time of Maximum Calculator Points: 70 Period: 27.99000 PE: ±19.35000 RM5: 2.5127 2013/05/03 @ 22:28:19 JD (LT) := 2456416.4282 Session: 282 IM: -6.366 DM: 14.975 RM: 12.420 ctive Session/Observation Files: PHSESS / PHOBSS

70 points in 3:45 hours

2038 Bistro rotation time find out

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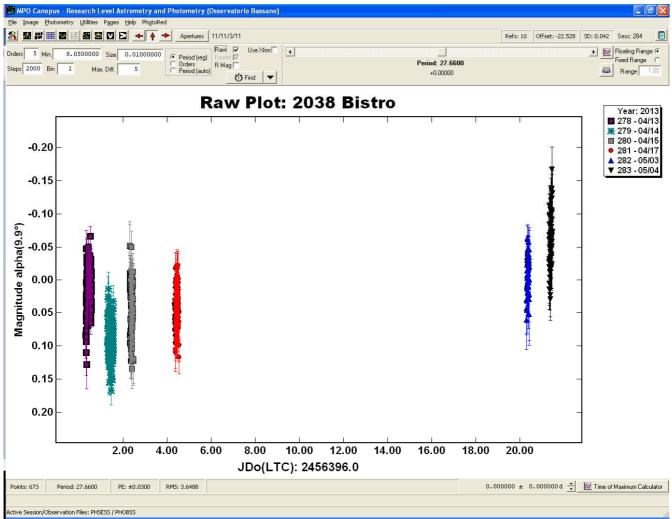


76 points in 3:20 hours

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Analysis

A first check was done with all raw values.

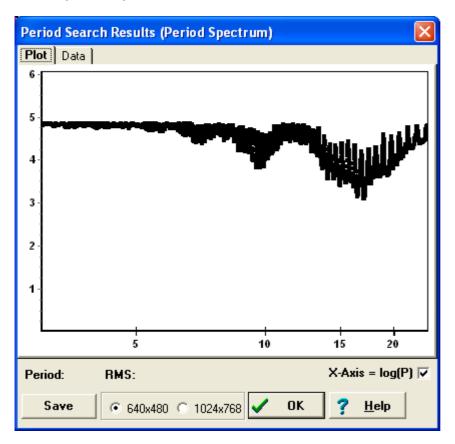


Sessions from 278 to 282 have a good catalog check. Delta compensation is left to 0 Session 283 was measured without the use of solar type stars. It appears a little bit upper the other. This is initially excluded from analysys.

2038 Bistro rotation time find out

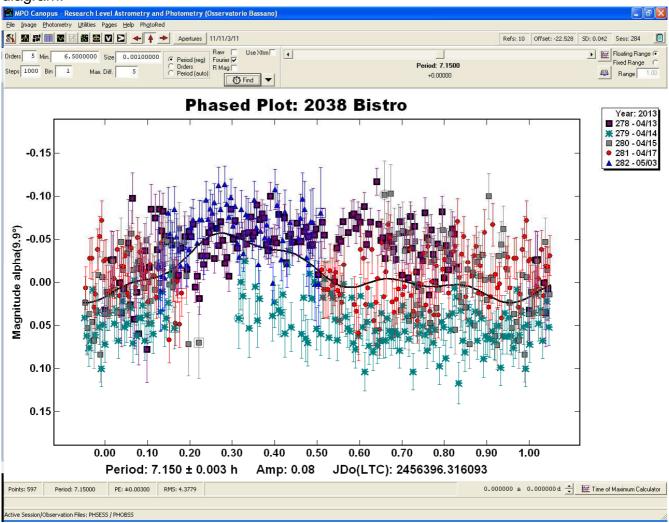
From single night measurement is clear period should be more than 3 hours if monomodal and 6 hours if bimodal.

A first analysis was done in the range between 3 and 24 hours with step 0.01. This is period spectrum.



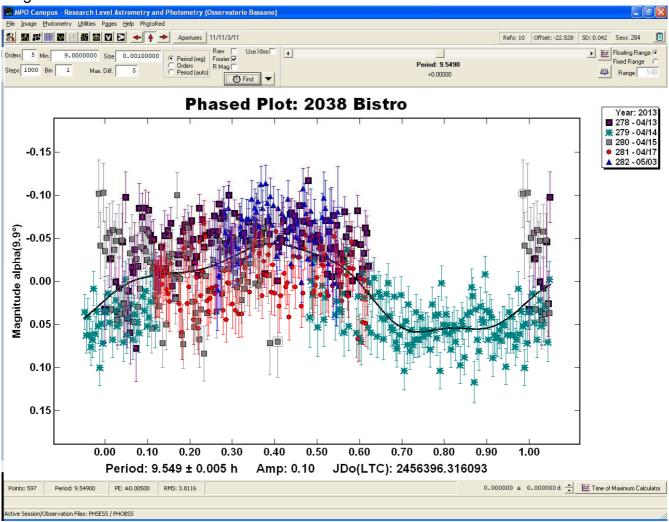
It show possible rotation time at: 7, 9.5, 17

An analysis in the range between 6.5 and 75 hours with step 0.001 shows this phase diagram.



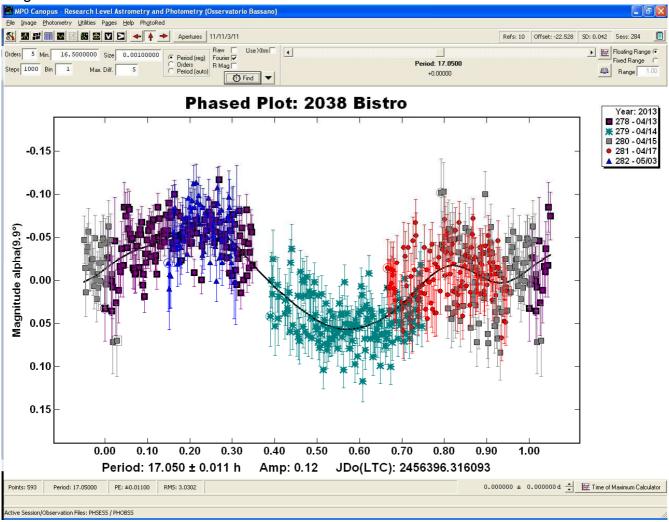
No correlation

An analysis in the range between 9.0 and 10.0 hours with step 0.001 shows this phase diagram.



No good correlation.

An analysis in the range between 16.5 and 17.5 hours with step 0.001 shows this phase diagram.



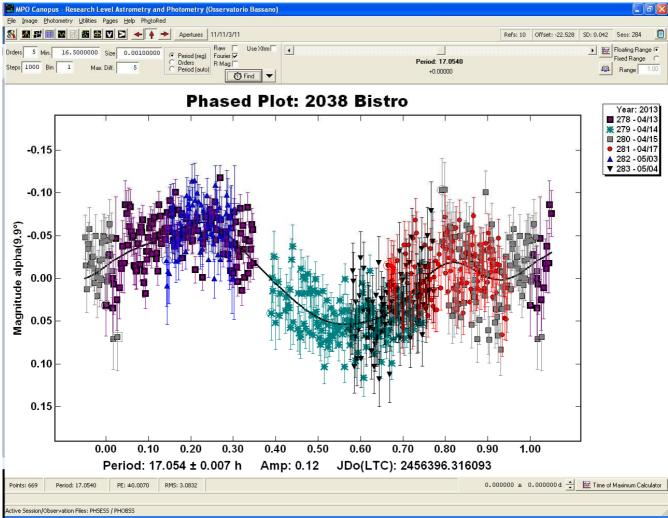
Good correlation.

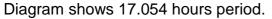
The better correlation is at period 17.052.

Sessions overlapping is not so high and amplitude is very low so we decided to don't go to RMS minimum search playing around delta comp.

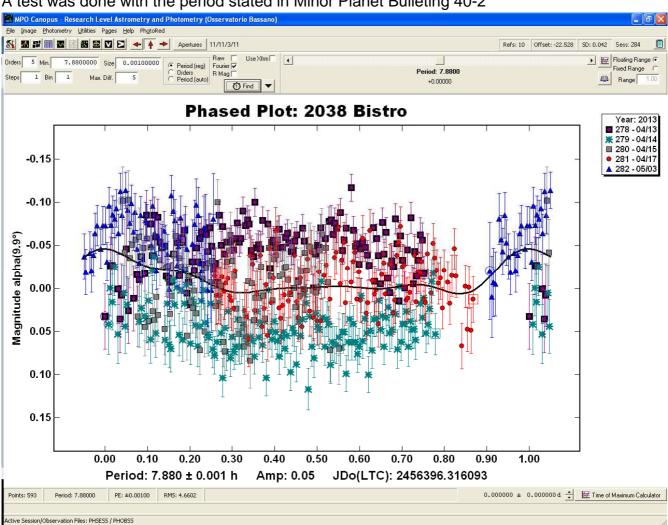
Now session 283 is introduced. Its delta comps is found trying different values util RMS decrease. At its end delta comp sessions is 0.140

With this phased plot.





2038 Bistro rotation time find out



A test was done with the period stated in Minor Planet Bulleting 40-2

No correlation

2038 Bistro rotation time find out

Conclusion

2038 Bistro. It was selected from "Lightcurve Photometry opportunities: 2013 April-June" *Minor Planet Bulletin 40*. With period = 7.88 hours, amplitude 0.24 Mag. and quality code 1. It was been observed for 6 nights covering 21 days span. It shows a very low amplitude comparable with the measurement noise. Fortunately all sessions have very low catalog check dispersion, it is very useful in low amplitude light curve. An analysis on reported period doesn't show any correlation with it. A good correlation was be found on period P =17.071 hours with amplitude *A* = 0.12 ± 0.02 Mag. This is the result suggested to this research.