

PHOTOGRAPHIC MEASUREMENTS OF ASTEROIDS 16, 41, AND 313

Saverio Arlia
Observatorio Astronomico Plomer
Ciudadela, Buenos Aires
Argentina

(Received: 18 April Revised: 29 April)

Photographic measurements of asteroids 16 Psyche, 41 Daphne, and 313 Chaldaea made at Observatoria Astronomical Plomer during 1999 are reported.

The photographic astrometry results reported here were made at Observatorio Astronomico Plomer using a 0.15m f/6 Newtonian telescope and 35 mm camera using Tri-X film. The observations were obtained at W 58° 32' 04" -34° 38' 00" altitude 32m. Reference stars were selected from the SAO catalog and the measurement precision was approximately 0.01 mm.

Minor Planet	Date UT	R.A. (B1950.0)	DEC.	Std.Dev.
00016	1999 07 31.05153	20 54 09.43	-15 41 50.5	1.6 1.4
00016	1999 07 31.06889	20 54 08.57	-15 41 54.6	1.2 0.8
00016	1999 08 01.05153	20 53 20.83	-15 46 11.9	2.2 1.0
00016	1999 08 01.07040	20 53 19.91	-15 46 16.8	1.5 0.4
00016	1999 08 03.05145	20 51 42.90	-15 54 59.0	1.8 0.7
00016	1999 08 03.06119	20 51 42.25	-15 55 01.3	1.6 0.7
00016	1999 08 08.04696	20 47 36.02	-16 17 11.1	1.0 0.4
00016	1999 08 08.06120	20 47 35.30	-16 17 16.5	1.1 0.9
00016	1999 08 11.06081	20 45 08.14	-16 30 36.2	1.6 1.7
00016	1999 08 13.04506	20 43 32.48	-16 39 13.8	2.0 1.2
00016	1999 08 18.03967	20 39 40.47	-17 00 29.2	2.5 1.4
00016	1999 08 23.01465	20 36 07.46	-17 20 26.2	1.5 1.1
00016	1999 08 26.05500	20 34 08.90	-17 31 51.7	0.7 1.5
00016	1999 08 26.06811	20 34 08.34	-17 31 56.1	0.5 1.1
00016	1999 08 29.02172	20 32 22.99	-17 42 18.4	0.8 0.4
00016	1999 09 02.97803	20 29 50.43	-17 58 15.8	4.1 1.5
00016	1999 09 09.97685	20 27 13.63	-18 17 01.4	1.4 0.4
00016	1999 09 10.03276	20 27 12.64	-18 17 08.7	1.7 0.3
00016	1999 09 13.95643	20 26 17.66	-18 25 35.2	2.1 1.6
00016	1999 09 14.02201	20 26 16.84	-18 25 42.3	0.1 0.0
00016	1999 09 15.00814	20 26 06.89	-18 27 33.4	1.0 1.4
00016	1999 09 15.01712	20 26 06.83	-18 27 35.6	0.2 0.7

Minor Planet	Date UT	R.A. (J2000.0)	DEC.	Std.Dev.
00041	1999 07 17.98771	16 20 29.33	+03 33 26.8	0.9 1.5
00041	1999 07 18.01952	16 20 29.77	+03 33 10.5	1.9 2.5
00041	1999 07 21.93695	16 21 48.97	+02 53 50.4	2.1 0.9
00041	1999 07 21.96058	16 21 49.47	+02 53 36.6	0.8 0.9
00041	1999 07 22.01722	16 21 50.54	+02 53 02.6	0.7 0.7
00041	1999 07 22.96344	16 22 13.60	+02 43 19.8	0.8 0.4
00041	1999 07 22.97749	16 22 13.94	+02 43 11.3	0.6 0.5
00041	1999 07 23.02174	16 22 14.90	+02 42 44.8	0.4 0.2
00041	1999 07 24.93844	16 23 05.94	+02 22 47.6	0.7 1.6
00041	1999 07 24.96200	16 23 06.48	+02 22 30.5	1.5 0.6
00041	1999 07 25.02373	16 23 08.09	+02 21 53.2	0.8 0.4
00041	1999 07 26.95230	16 24 05.26	+02 01 34.4	1.1 0.6
00041	1999 07 26.97383	16 24 05.75	+02 01 22.1	1.0 0.6
00313	1999 01 05.03694	06 00 21.63	+01 40 50.3	0.7 1.2
00313	1999 01 05.05642	06 00 20.66	+01 40 54.8	0.9 0.9
00313	1999 01 05.08413	06 00 19.26	+01 41 02.2	1.4 1.1
00313	1999 01 06.03997	05 59 28.43	+01 44 57.2	1.7 0.8
00313	1999 01 06.05498	05 59 27.60	+01 45 02.6	1.2 1.8
00313	1999 01 06.07828	05 59 26.47	+01 45 09.5	1.9 1.8
00313	1999 01 07.03656	05 58 36.66	+01 49 21.9	0.6 2.0
00313	1999 01 07.05742	05 58 35.41	+01 49 27.4	0.9 0.4
00313	1999 01 07.07860	05 58 34.40	+01 49 32.3	0.6 1.4
00313	1999 01 08.02479	05 57 46.00	+01 54 01.2	1.4 0.4
00313	1999 01 08.03409	05 57 45.47	+01 54 03.4	0.7 0.9
00313	1999 01 08.05880	05 57 44.24	+01 54 10.5	1.5 1.1
00313	1999 01 08.07796	05 57 43.40	+01 54 15.8	1.9 0.9
00313	1999 01 10.03431	05 56 06.94	+02 04 23.3	1.5 0.9
00313	1999 01 10.06050	05 56 05.72	+02 04 28.5	1.3 1.1

ASTEROID PHOTOMETRY AT NORTH PINES OBSERVATORY

Gary Frey
P.O. Box 1114
Mayer, AZ 86333
gfreynpo@primenet.com

(Received: 16 February Revised: 4 March)

The following article contains a description of North Pines Observatory and the results of my first attempt to determine the rotational period of an asteroid. These observations clearly reveal the previously known 2.869 hour period of 321 Florentina which displayed a lightcurve amplitude of 0.61 magnitude in December 1999.

I have performed photometry of variable and binary stars for the past 15 years. All of my photometry has been taken with B, V, R, and I, filters and has been reduced to the standard Johnson system so data can be combined with others. In 1999, I attended the Minor Planet Conference in Flagstaff and became very interested in the photometry aspect of asteroids. Brian Warner gave an interesting talk about asteroid photometry, attracting me to give it a try.

North Pines Observatory is located in Mayer, Arizona, 85 miles North of Phoenix at an elevation of 4531 feet. I use a 0.51 meter f/10 open truss tube Classical Cassegrain that I designed and built 6 years ago. Three computers are located in a 5 meter dome. One is for telescope control, one is for the CCD camera on a 4-1/4" f/4.5 finder and one is for the CCD camera on the 0.51 Meter scope. These three computers and dome rotation are operated from a control room 150 feet from the observatory. Three other computers (one for display of previous CCD images, one for Project Pluto star charts, and one for internet access) are also located in the control room. Telescope control is an open loop stepper motor system, capable of 20 minute unguided exposures.

After looking at several commercial cameras, I decided to build the Cookbook 245 camera, which works extremely well. The 0.51 Meter f/10 scope is used as an f/3.3 system by employing the Optec Maxfield focal reducer, which does not have any vignetting or aberrations and the stars at the edge of the field are still round. The image acquisition program automatically takes an image for a specified exposure and then waits a specified time between exposures. The telescope runs all night without tracking corrections.

To choose an asteroid for study, I searched the web site at http://www.astro.uu.se/planet/rotat_egn.html and found the list of "Rotational periods of asteroids". Reviewing this list I found 321 Florentina, which had a reported period of 2.87 hrs and was indicated to have a very reliable synodic rotation period. I performed several exposure tests on M67 with unfiltered exposure times to obtain a signal-to-noise ratio of greater than 100 and settled on 180 seconds for a 14.5 magnitude star.

To obtain accurate asteroid photometry, a group of LONEOS stars were imaged and they were used to determine a magnitude vs. intensity relationship so that the comparison stars in the asteroid image had an accurate magnitude. The LONEOS star images along with each asteroid image were entered into the Canopus

program, where the LONEOS stars and comparison stars and asteroid are measured and the sky background subtracted. The program then calculates the instrumental differential magnitude of the asteroid from all the corrected magnitude comparison stars and generates a data file. All images are flat fielded and dark subtracted before they are evaluated for photometry.

Asteroid 321 Florentina was imaged on Universal Dates of Dec. 7, 1999 for 82 images and Dec. 8, 1999 for 108 images. As shown in Figure 1, the final period was determined to be $2.869 \text{ hr} \pm 0.008 \text{ hr}$ with an amplitude of 0.61 mag. The published period is 2.87 hr, as indicated in the "Rotational periods of asteroids" data table. Data were taken with an unfiltered CCD camera.

Data supplied by MPO 2000 indicated that this asteroid is about 18 miles in diameter and at the date of imaging the asteroid was about 1.861AU (17,300,000 miles) from the Earth at about 14.2 magnitude.

In conclusion, it appears that my telescope and CCD system and the Canopus software produce very accurate light curve results. The next step will be to determine the asteroid absolute magnitude based upon the Johnson system.

I wish to thank Brian Warner for his help on the Canopus software.

References

Henden, Arne (1999). "Photometric Techniques of moving objects." In proceedings of the 1999 Minor Planet Amateur/Professional Workshop (P. Comba, Ed), pp 57-64.

Warner, Brian D. (1999). "An Automated Program for Determining Asteroid Lightcurves." In proceedings of the 1999 Minor Planet Amateur/Professional Workshop (P. Comba, Ed), pp 75-80.

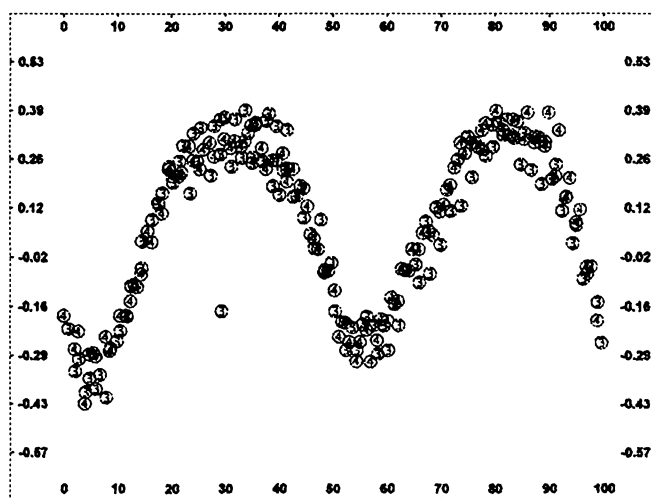


Figure 1. Composite lightcurve of 321 Florentina obtained on 1999 December 7 and 8 UT, with the period of 2.869 hours. The measured amplitude is 0.61 mag. The lightcurve is corrected for light travel time.

GENERAL REPORT OF POSITION OBSERVATIONS BY THE ALPO MINOR PLANETS SECTION FOR THE YEAR 1999

Frederick Pilcher
Illinois College
Jacksonville, IL 62650 USA

Observations of positions of minor planets by members of the Minor Planets Section in calendar year 1999 are summarized, along with significant discrepancies from the predicted magnitudes noted for a few planets.

During the year 1999 a total of 4908 positions of 934 different minor planets were reported by members of the Minor Planets Section. Of these 52 are photographic measures (denoted P) and 3088 are CCD images (denoted C). All the rest are approximate visual positions. All of the numbered minor planets were observed at positions agreeing within errors of measurement with those predicted from their published ephemerides.

The summary lists minor planets in numerical order, the observer and telescope aperture (in cm), UT dates of the observations, and the total number of observations in that period. The year is 1999 except as otherwise indicated, when a series of observations begun in calendar 1999 continued into 2000.

Positional observations were contributed by the following observers:

Observer, Instrument	Location	Planets	Positions
Arlia, Saverio 15 cm f/6 Newtonian	Buenos Aires, Argentina	3	52P
Camaiti, Plinio 13 cm f/6 refractor+CCD 20 cm Schmidt-Cass.+CCD	Torino, Italy	15	16C
Faure, Gerard 20 cm Celestron	Col d'Arleszier, France	112	277
Foglia, Sergio 10x50 binoculars 20x80 binoculars	Milan, Italy	7	14
Garrett, Lawrence 32 cm f/6 reflector	Fairfax, Vermont, USA	146	303
Giambersio, Antonio 20 cm f/6.3 reflector + CCD	Potenza, Italy	10	38C
Goretti, Vittorio 25 cm f/4 Schmidt + CCD	Pianoro, Italy IAU Observatory 610	943	2915C
Harvey, G. Roger 74 cm Newtonian	Concord, North Carolina, USA	221	732
Harvey, G. Roger and Farney, Mike 20 cm Celestron	Dakota Wesleyan University Mitchell, South Dakota	2	11
Hudgens, Ben 25 cm f/4.5 Dobsonian	Memphis, Tennessee USA and environs	79	166
Lucas, Michael 20 cm f/6 Newtonian 35 cm f/11 Schmidt- Cassegrain	Ft. Myers, Florida USA	19	59(1C)
Pilcher, Frederick 35 cm Celestron	Jacksonville, Illinois, USA	30	187
Pryal, Jim 20 cm Schmidt- Cassegrain	Ravensdale, Washington, USA	10	20
Puccini, Silvano 25 cm f/5.1 Newtonian + CCD	AIRALI Observatory, Rosignano, Italy	8	42C