PHOTOMETRIC OBSERVATIONS OF 782 MONTEFIORE, 3842 HARLANSMITH, 5542 MOFFATT, 6720 GIFU, AND (19979) 1989 VJ

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PHOTOMETRIC OBSERVATIONS OF 782 MONTEFOIRE, 3842 HARLANSMITH, 5542 MOFFATT, 6720 GIFU, AND (19979) 1989 VJ

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Five solar system minor planets were measured photometrically between 2012 October and December using the SARA (Southeastern Association for Research in Astronomy) telescopes located in Kitt Peak National Observatory in USA and Cerro Tololo Inter-American Observatory in Chile. The following synodic periods were found: 782 Montefiore $P = 4.0728 \pm 0.0006$ h; 3842 Harlansmith, $P = 2.7938 \pm 0.0005$ h; 5542 Moffatt $P = 5.187 \pm 0.001$ h; 6720 Gifu, $P = 4.231 \pm 0.001$ h; and (19979) 1989 VJ, $P = 7.568 \pm 0.005$ h.

All observational data reported here were obtained using the two Southeastern Association for Research in Astronomy telescopes (SARA North and SARA South). The SARA North telescope has an aperture of 0.91 m and is located at the Kitt Peak National Observatory in USA. This telescope has an effective focal ratio of f/7.5. When coupled to an ARC (Astronomical Research Cameras, Inc) CCD camera, this results in a resolution of 0.86 arcsec/pixel (binned 2×2) and FOV = 14.6×14.6 arcmin. A Bessell R filter was used when taking images. The camera was cooled to −109°C. Image acquisition was done with DS9. The SARA South telescope has an aperture of 0.61 m and is located at the Cerro Tololo Inter-American Observatory in Chile. This telescope has an effective focal ratio of f/13.5. When coupled to a QSI 683s CCD camera, this results in a resolution of 0.27 arcsec/pixel (binned 2×2) and FOV = 7.51×5.70 arcmin. An SDSS r filter was used when taking images. The camera temperature was set at −25°C. Image acquisition was done with MaxIm DL. Both telescopes were operated remotely. All images were reduced with master bias, dark and flat frames with calibration frames created using IDL. Period analysis was performed using MPO Canopus, which incorporates the Fourier analysis algorithm (FALC) developed by Harris (Harris et al., 1989). The asteroids were selected from the list of asteroid photometry opportunities published on the Collaborative Asteroid Lightcurve Link (CALL) website (Warner et al., 2008), and the lightcurve opportunities published in the Minor Planet Bulletin (Warner et al., 2012).

782 Montefiore. This asteroid was selected based on its potential for shape modeling (Warner et al., 2012). Five observation sessions were made between 2012 November 8 and December 2. We obtained a period of $P = 4.0728 \pm 0.0006$ h and an amplitude of $0.43 \pm 0.01$ mag. Behrend (2007) studied this asteroid previously and obtained $P = 4.0730$ h with an amplitude of 0.45 mag. Our period is consistent with that obtained by Behrend.

3842 Harlansmith. We observed this asteroid on three nights: 2012 November 28, 29, and December 10. We obtained a synodic period of 2.7938 ± 0.0005 h and an amplitude of 0.34 ± 0.03 mag. No previously published results were found.

5542 Moffatt. Alvarez-Candal et al. (2004) observed this asteroid and obtained a period of 5.195 h, but with less than 100% lightcurve coverage, and the CALL website assigned it a quality index $U = 1$. We made five observation sessions between 2012 November 15 and December 9 and obtained a synodic period of $P = 5.187 \pm 0.001$ h and an amplitude of 0.10 ±0.01 mag. Our period is consistent with that obtained by Alvarez-Candal et al.

6720 Gifu. We made three observation sessions of this asteroid between 2012 October 31 and December 9. We obtained a synodic period of 4.231 ± 0.001 h and an amplitude of 0.39 ± 0.01 mag. No previously published results were found.

(19979) 1989 VJ. Behrend et al. (2006) observed this asteroid previously and obtained a period of 1.3 hours, and the CALL website assigned it a quality index $U = 1$. We observed this asteroid for three nights: 2012 November 28, 29, and December 9. We obtained a synodic period of 7.568 ± 0.005 h and an amplitude of 0.29 ± 0.03 mag. Our period does not agree with that obtained by Behrend.

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References


Lightcurves for the asteroids 366 Vincentina, 592 Bathseba, and 1554 Yugoslavia were obtained from 2012 May to October at the Belgrade Astronomical Observatory using differential aperture photometry. The results found for the synodic periods and amplitudes are reported.

CCD photometric observations of 366 Vincentina, 592 Bathseba, and 1554 Yugoslavia were carried out using a 0.4 m f/10 Schmidt-Cassegrain telescope with an SBIG ST-10XME CCD camera operating at 2x2 binning with a 0.69 arcsec/pixel resolution. Exposures were unguided. The usual exposure times were fairly short (between 20 and 45 seconds depending on target brightness).