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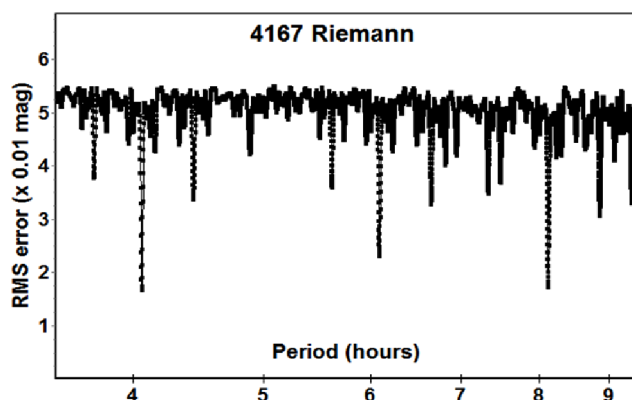
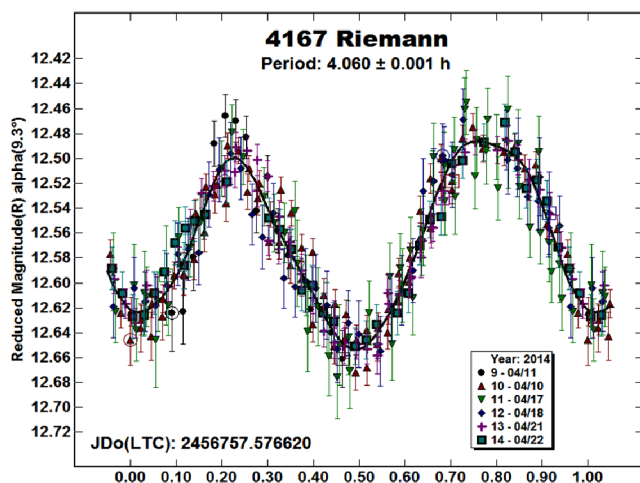
LIGHTCURVE ANALYSIS FOR 4167 RIEMANN

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Photometric observations of 4167 Riemann were made over six nights in 2014 April. A synodic period of $P = 4.060 \pm 0.001$ hours was derived from the data.

4167 Riemann is a main-belt asteroid discovered in 1978 by L. V. Zhuraveya. Observations of the asteroid were conducted at the Phillips Academy Observatory, which is equipped with a 0.4-m $f/8$ reflecting telescope by DFM Engineering. Images were taken with an SBIG 1301-E CCD camera that has a 1280x1024 array of 16-micron pixels. The resulting image scale was 1.0 arcsecond per pixel. Exposures were 300 seconds and taken primarily at -35°C . All images were guided, unbinned, and unfiltered. Images were dark and flat-field corrected with *Maxim DL*. Processed images were measured with *MPO Canopus* (BDW Publishing) using a differential photometry technique. Comparison stars in the image field were chosen to have near-solar color with the “comp star selector” feature of *MPO Canopus*.



Period analysis was carried out by the authors using *MPO Canopus* and its Fourier analysis feature developed by Harris (Harris *et al.*, 1989). The resulting lightcurve consists of 288 data points. The period spectrum strongly favors the bimodal solution. The resulting lightcurve has synodic period $P = 4.060 \pm 0.001$ hours and amplitude 0.17 mag. Dips in the period spectrum were also noted at 8.1200 hours ($2P$) and at 6.0984 hours ($3/2P$). A search of the Asteroid Lightcurve Database (Warner *et al.*, 2009) and other sources did not reveal previously reported lightcurve results for this asteroid.

Acknowledgements

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