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Periodicity of Mrk 501 in Optical Wavelengths L JOSEPH RIVEST, MCKAY OSBORNE, JOSEPH MOODY, MARCUS HOLDEN, ERIC HINTZ, MICHAEL JONER, ELIZABETH JEFFERY, Brigham Young Univ - Provo —
We present data for Mrk501 from 2009-2016 taken by ROVOR and WMO in Johnson B, V, and R filters. An aperture of radius 5" was used for all data. Photometry was referenced to the same ensemble of stars in all frames. We find strong evidence for a regular light curve matching a sine wave of amplitude around $1 \times 10^{-15}(erg\ s^{-1}cm^{-2}\mathring{A}^{-1})$ in B, $0.6 \times 10^{-15}(erg\ s^{-1}cm^{-2}\mathring{A}^{-1})$ in V, and $0.5 \times 10^{-15}(erg\ s^{-1}cm^{-2}\mathring{A}^{-1})$ in R, and with a period of $\sim 2000 \pm 200$ days. Additionally, a linear combination of sine waves having periods of $\sim 113 \pm 3$ days and $\sim 70 \pm 5$ days also show a strong presence in the light curve, both with amplitudes of around $0.25 \pm 0.03 \times 10^{-15}(erg\ s^{-1}cm^{-2}\mathring{A}^{-1})$ in V. These results are consistent with X-ray data and are qualitatively similar to the light curve found for NGC5548 (Bon et al, 2016). We lend these results as potentially bearing further evidence for the presence of a binary super-massive balck hole in Mrk 501.

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