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Learning from Star Shadows: Investigating an Activity Cycle on Eclipsing Binary Star FL Lyr GEORGIA STOLLE-MCALLISTER, Kenyon College, PHILIP S. MUIRHEAD, EUNKYU HAN, Boston University, GARY WALKER, REGINA JORGENSON, Maria Mitchell Observatory — Analysis of eclipsing binary stars is essential for determining basic stellar properties, which then inform models that are used for wider astrophysical studies, including stellar evolution, stellar population densities, and cosmic distance scales. This project uses data from the advanced space-based telescopes Kepler and TESS, as well as ground-based observations from the Maria Mitchell Observatory and Sierra Remote Observatory to examine FL Lyr, one of the brightest eclipsing binary stars that has sun-like components. A curious trend in the Kepler data shows the primary eclipse deepening over time, while the secondary eclipse is getting shallower. Using a Gaussian processes method, we extract the best fit parameters of the FL Lyr system at different eclipse events and find that the only parameter that changes significantly over time is the surface brightness ratio. From this we conclude that the trend in the Kepler data is due to an activity cycle on the star, which is also observable in the out of eclipse variation of the light curves. This project was supported in part by the NSF REU grant AST-1757321 and by the Nantucket Maria Mitchell Association.

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