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Perturbation effect of stellar spots on light curves of gravitational microlensing

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Abstract

One of the advantages of observations of gravitational microlensing is stellar spots detection. Our aim in this paper is to study and characterize the perturbations due to stellar spots on the microlensing light curves. Considering a suitable formalism for the stellar spots, we simulate the microlensing of spotted source stars. One of the effects of a spot on stellar light curve is the local demagnification (where the lens is crossing the stellar spot) and it causes asymmetric perturbations on the light curve. The spots that locate at the source center after projection make larger and deeper perturbations than the spots locate the stellar limbs. In caustic crossing binary microlensing events, the typical-size spot-induced perturbations mostly make (more than 40 percent) the relative deviations larger than 5. This fraction is bigger for single lensing events.

Keywords: gravitational microlensing, stellar spots, numerical approach

For full article, refer to the Persian section