On the possibility of magnetic field detection of a source star at caustic crossing

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Abstract
In a gravitational microlensing event, at caustic crossing, the flux of a spot can be magnified several times with respect to the source star. This magnification contrast provides a unique opportunity to measure the magnetic field over a source star. In this work, we investigate the possibility of magnetic field detection through the Zeeman effect when a source crosses a caustic line. Using Fourier analysis, one can separate other broadening agents from actual Zeeman broadening. At next stage, we use gravitational microlensing formalism to measure the magnification contrast of spot and source, and finally, using two reliable strategies of observation and Monte Carlo method, we find the detectability of magnetic field. The resolution and the signal to noise rate in each strategy determine which magnetic fields are detectable.

Keywords: gravitational microlensing, stellar magnetic field, spectroscopy

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