



Iranian Journal of Physics Research, Vol. 20, No. 3, 2020
DOI: 10.47176/ijpr.20.3.71096

Limb-darkening effect of source stars in gravitational microlensing observations in different filters

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(Received 25 July 2020 ; in final form 25 August 2020)

Abstract

Spherical property of stars means that the flux received from different parts of their surface is not uniform and less than its center at the edges. Thus, the edges appear darker than the center of the star; this is called the limb-darkening effect. The amount of the limb-darkening effect depends on the stellar atmosphere, stellar temperature, gravity and metallicity. In this paper, we offer a method to better characterize the source stars in high-magnification microlensing events. In high-magnification microlensing events in which the lens is transiting the source surface, the non-uniformity of the stellar flux and the magnification factor as a function of the lens location can both cause the stellar color changes with time. Measuring the stellar color while lens is crossing the source surface will offer additional information regarding the dependence of the limb-darkening parameters on the wave length and hence, the stellar atmosphere parameters and the source star parameters.

Keywords: gravitational microlensing, limb-darkening effect, stellar atmosphere

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