GRAVITATIONAL MICROLENSING OF AGN DUSTY TORI

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We investigated gravitational microlensing of AGN dusty tori in the case of lensed quasars in the infrared domain. The dusty torus is modeled as a clumpy two-phase medium. To obtain spectral energy distributions and images of tori at different wavelengths, we used the 3D Monte Carlo radiative transfer code SKIRT. A ray-shooting technique has been used to calculate microlensing magnification maps. We simulated microlensing by the stars in the lens galaxy for different configurations of the lensed system and different values of the torus parameters, in order to estimate (a) amplitudes and timescales of high magnification events, and (b) the influence of geometrical and physical properties of dusty tori on light curves in the infrared domain. We found that, despite their large size, dusty tori could be significantly affected by microlensing in some cases, especially in the near-infrared domain (rest-frame). The very long timescales of such events, in the range from several decades to hundreds of years, are limiting the practical use of this method to study the dusty tori properties. However, our results indicate that, when studying flux ratios between the images in different wavebands of lensed quasars, one should not disregard the possibility that the near and mid-infrared flux ratios could be under the influence of microlensing.