Direct Detection of Exoplanets in Microlensing Events

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We investigate the possibility of exoplanet detection orbiting source stars in microlensing events through Nancy Grace Roman (Previously named WFIRST) observations. Weperform a Monto Carlo simulation on the detection rate of exoplanets via microlensing, assuming that each source star has at least one exoplanet. The exoplanet can reflect part ofthe light from the parent star or emit internal thermal radiation. In this new detection channel, we use microlensing as an amplifier to magnify the reflection light from the planet. In theliterature, this mode of detecting exoplanets has been investigated much less than the usual mode in which the exoplanets are considered as one companion in binary lens events.Assuming 72 days of observation per season with the cadence of 15 minutes, we find the probability of rocky planet detection with this method to be virtually zero. However, there isnon-zero probability, for the detection of Jovian planets. We estimate the detection rates of the exoplanets by this method, using Nancy Grace Roman observation to be 0.012% insingle lens events and 0.9% in the binary lens events.