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VBMicrolensing: a code for the computation of microlensing of multiple systems

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Microlensing is a specific case of gravitational lensing in which we observe an apparent amplification of the brightness of the source in a typical bell-shaped light curve. Microlensing enables us to study a variety of objects; in particular, it is the most promising technique for finding Earth-mass extrasolar planets located beyond the snowline.
The computation of microlensing light curves poses a significant computational challenge because it is extremely time-consuming. The release of the VBBinaryLensing code, utilizing the contour integration method, represents a notable advancement in the field, being the fastest public code for calculating microlensing effects. However, it is limited to binary events.
In this work, we present a new code, VBMicrolensing, with the aim of expanding upon the previous one to analyze systems with more than two lenses. This includes triple star systems, host stars with two planets in the lensing zone, or even planetary systems with exomoons.
The ability to model multiple-lens events will play an important role, especially with upcoming space missions such as the Nancy Grace Roman Space Telescope mission. Scheduled for launch in 2026, Roman incorporates a microlensing planet-finding program and will be more sensitive than current instruments. It is expected to reveal numerous microlensing events caused by multiple systems.
The availability of a public code capable of solving systems with several lenses becomes fundamentally important and would make it possible to contribute to future analyses of microlensing events.

sessioni congresso

Stelle, popolazioni stellari e mezzo interstellare

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