Abstracts submitted for a poster

In-person: 3 • Virtual: 1 • Total: 4

Symbols: In-person participant Virtual participant

A Tool for Gravitational Microlensing Events Simulation with a Galactic Model Based on Gaia and Microlensing Data

Naoki Koshimoto • NASA Goddard Space Flight Center & University of Maryland

This poster introduces genulens, a public tool to simulate microlensing events using Monte Carlo simulation based on the Galactic model developed by Koshimoto, Baba & Bennett (2021). The Galactic model includes the asymmetric drift of Galactic disk stars and the dependence of velocity dispersion on Galactic location in the kinematic model, which has not been considered in most previous models used for microlensing studies. The model was developed by fitting to spatial distributions of the Gaia DR2 disk velocity, VVV proper motion, BRAVA radial velocity, OGLE-III red clump star count, and OGLE-IV star count and microlens rate, optimized for use in microlensing studies. Using genulens, you can calculate the probability distribution of microlens parameters based on the new Galactic model. This enables you to do Bayesian analysis to derive the lens parameters for individual events, to distinguish degenerate models based on the Galactic prior, and to perform statistical analysis by comparing the distribution of microlens parameters between observations and models. The poster shows several examples of its use.

Impact of parallax on long duration microlensing events toward the Magellanic Clouds

Marc Moniez • IJCLab-IN2P3

When searching for multi-year microlensing events towards the Magellanic Clouds, the question arises of the effect of the parallax-induced light curve distortion on the detection efficiency of the search algorithms. We have studied this problem in the context of an event search spread over more than 10 years (EROS+MACHO and LSST). We show that the tolerance of the standard search algorithms makes this effect negligible on the detection efficiency. On the other hand, we show that these parallax effects should be frequently detectable in the case of an LSST type survey.

AMPM: broadening constraints on asteroid-mass PBH dark matter via microlensing

Renee Key • Swinburne University of Technology

Primordial Black Hole (PBH) Microlensing surveys have placed stringent bounds on compact object dark matter theories (MACHOs). Lensing is the most effective and efficient tool for the detection of transiting PBHs that are insufficiently massive for dynamical effects to be observable. Among the various previous surveys, a wide range of mass ranges for PBHs have been constrained to be less than O(10)% of the galactic halo dark matter density. Microlensing has ruled out PBH masses of 10^{-11}–$10^{5}\,M_{\odot}$. However, there remains a few narrow mass regions yet to be researched. The mass gap between femtolensing and the previous microlensing constraints is termed the 'asteroid-mass' range, spanning PBHs of 10^{-15}–$10^{-10}\,M_{\odot}$. Telescopic cadence is directly related to the observability of low-mass compact transients. The faster the cadence, the higher the resolution of the fast microlensing events. The AMPM (Asteroid-Mass Primordial black hole Microlensing) survey utilises rapid-fire cadence light curves of millions LMC stars to build a new database of transient detections. AMPM uses DECam exposures with a cadence of 40 seconds over 5 nights of observation and will broaden PBH dark matter constraints into the asteroid-mass range. This poster presents the current status and outcomes of the AMPM survey.

Impact of Rubin precursor observations on Microlensing events in Roman

Anibal Varela • Universidad de San Martin Argentina

The Roman space mission is expected to be launched about one year after Rubin starts science operations Roman will carry out a microlensing survey towards the galactic bulge in 2.2 sq.deg. Will have blocks of 72 day seasons with a 15 min cadence. Can Rubin precursor data improve the detection of microlensing events in Roman, in particular by providing a baseline for the sources? This study seeks to assess the scientific return of adding Rubin data to Roman from the standpoint of identifying microlensing events.