

Milky Way Black Holes Hiding in Plain Sight

Wednesday, 13 December 2023 16:00 (20 minutes)

We will present our investigation into the abundance and properties of black holes through photometric gravitational microlensing surveys of the Milky Way. We have used the PopSyCLE simulation suite to estimate the abundance and characteristics of black holes in existing and future surveys, both for stellar end-product and primordial formation mechanisms. Based on these simulations we have determined optimal filters for black hole identification in photometric light curve surveys and used these simulations in conjunction with the microlensing survey data to estimate the mass and class (i.e., star, black hole, neutron star, etc.) probability density functions. Our method provides a new means of finding far more black holes than traditional approaches, as well as a new means of constraining the properties of the Milky Way. An underlying thread of the presentation will discuss the microlensing communities historical use of biased estimators (e.g., histograms of single point estimators), introduce alternative unbiased estimators, and discuss the impact to physical interpretations both past and present.

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