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SUBMISSION ROLE: Research Contributed or Dissertation

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TITLE: Optical Variability Signatures from Massive Black Hole Binaries

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): The hierarchical merging of dark matter halos and their associated galaxies should lead to a population of supermassive black hole binaries (MBHBs). We consider plausible optical variability signatures from MBHBs at sub-parsec separations and search for these using data from the Catalina Real-Time Transient Survey (CRTS). Specifically, we model the impact of relativistic Doppler beaming on the accretion disk emission from the less massive, secondary black hole. We explore whether this Doppler modulation may be separated from other sources of stochastic variability in the accretion flow around the MBHBs, which we describe as a damped random walk (DRW). In the simple case of a circular orbit, relativistic beaming leads to a series of broad peaks — located at multiples of the orbital frequency — in the fluctuation power spectrum. We extend our analysis to the case of elliptical orbits and discuss the effect of beaming on the flux power spectrum and auto-correlation function using simulations. We present a code to model an observed light curve as a stochastic DRW-type time series modulated by relativistic beaming and apply the code to CRTS data.

Contributing Teams:

PRESENTATION TYPE: Research Contributed

CURRENT SESSION TYPE: Contributed Oral Session

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