

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Observing and Modeling Ultracompact Binaries Detectable by LISA OLIVIA COOPER, Smith College, MICHAEL KATZ, Northwestern University, MICHAEL COUGHLIN, University of Minnesota, SHREYA ANAND, KEVIN BURDGE, California Institute of Technology, SHANE LARSON, Northwestern University — Many binary stellar remnants emit both gravitational and electromagnetic radiation as they rapidly orbit each other in ultracompact binary systems (UCBs). According to general relativity, UCBs strongly emit low frequency gravitational-waves (GW) detectable by the future Laser Interferometer Space Antenna (LISA). Current and upcoming long baseline time domain surveys such as the Zwicky Transient Facility and Large Synoptic Survey Telescope will observe many of these UCBs. To predict and verify UCB GW detections and maximize LISA’s scientific potential, it is necessary to both identify these UCBs in long baseline surveys and conduct follow-up observations of UCB candidates. We present a new fast periodic object search tool, GPU-Accelerated Conditional Entropy (gce), which searches time domain photometry for periodic sources over both periods and the time derivative of the period. To demonstrate this tool and constrain the range of UCBs we expect to be detectable, we simulate a catalog of gravitational waveforms and light curves for white dwarf UCBs in decaying orbits generated from Galactic binary population modeling. We also present follow-up observations of UCB candidates using Palomar Observatory’s Triple Spectrograph and Kitt Peak’s Electron Multiplying CCD.

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Date submitted: 10 Jan 2020

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