

Highlight

THE SYSTEMATIC SEARCH FOR GRAVITATIONAL WAVE SOURCES
USING SYNOPTIC SURVEYS

T. Kupfer¹ on behalf of the PTF/ZTF collaboration

¹*Division of Physics, Mathematics and Astronomy, California Institute of
Technology, Pasadena, CA 91125, USA*

Ultracompact binaries (UCB) are a rare class of binary systems with periods below 60 min (detached or semidetached), consisting of a neutron star (NS)/white dwarf (WD) primary and a He-star/WD/NS secondary. The study of ultracompact binaries and their subsequent mergers are important to our understanding of such diverse areas as supernova Ia progenitors, production of r-process elements, binary evolution and they are predicted to be the strong gravitational wave sources in the eLISA and LIGO-Virgo band.

The Zwicky Transient Facility is the next generation of optical synoptic surveys utilizing the entire focal plane of 47 deg² of the 1.2m telescope on Mount Palomar. The field-of-view allows us to cover the entire visible sky in one night revisiting fields on timescales of a few hours and providing hundreds of visits per field each year. Part of the survey will be a public 3-4 night cadence all sky survey as well as a nightly sweep of the Galactic Plane. Science operations is expected to start by the end of 2017.

In this talk I will give an overview of the survey design and our effort to identify the optical counterpart to NS mergers triggered by LIGO. I am lead investigator of an approved high-cadence survey covering the full inner Plane visible from the northern hemisphere as part of ZTF. We will obtain 2-3 hr continuous lightcurves of each field with a cadence of 40 sec starting winter 2017 to identify the Galactic population of ultracompact binaries. I will give an overview of the survey as well as discuss the expected numbers of ultracompact eLISA sources from this survey.