

Space Science Seminar
Tuesday, 2015 September 27
10:30 a.m.
NSSTC/2096

**Optimizing Electromagnetic Follow-up Using
Shapelet Analysis for Automated Transient
Detection**

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Host: ZP12

With two confirmed observations of gravitational wave (GW) events, the era of GW astronomy has begun, however, a coincident observation of an electromagnetic (EM) counterpart has yet to be produced. In order to identify reliably and link potential EM counterparts, a major challenge to overcome is to find effective selection criteria to reduce the number of false-positives which are present when imaging over the large LIGO-Virgo probability skymaps. Specifically in the case of wide-field telescopes, differential image analysis suffers from imperfect image subtraction, in part due to variations of the point-spread function across the image.

I will discuss a pipeline that was developed to address this issue. Using a dedicated metric in a shapelet space, the point-likeness of subtracted image residuals can be characterized and any artifacts can be rejected with high efficiency. The pipeline has been used on a set of both PTF and DECam images spanning over representative LIGO-Virgo probability skymaps, removing on average up to 99.95% of all image subtraction artifacts.

I extract a rate of false-positives to be expected from EM Follow-up of LIGO-Virgo GW events and calculate a realistic joint GW-EM detection probability.

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