

High Energy Particle Seminar

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"The search for UV and gamma-ray transient counterparts to gravitational wave events"



The epochal detection of GW 170817 was accompanied by prompt gamma-ray emission and the discovery of a short-lived UV bright kilonova. NASA's Swift Observatory hosts the only fast-response UV telescope, as well as the most sensitive gamma-ray burst detector, in operation. I will describe the unique capabilities of the Burst Alert Telescope on board Swift, and detail techniques to maximize the probability of a joint GW/GRB detection. I will then motivate and describe the details of a maximum likelihood joint GW/GRB low latency sub-threshold analysis aimed at recovering a larger population of these events and significantly extending the GW detectors' horizon. However, most BNS mergers will not have associated gamma-ray emission due to the nature of the jet, while the kilonova emission is isotropic. Further, the early UV component is critical to breaking the degeneracy between competing models of the kilonova emission. The search for UV transients has unique challenges, and I will discuss these in the context of the Swift Gravitational Wave Galaxy Survey, a 5 Million second campaign currently underway to pre-image a large fraction of the likely host galaxies for binary neutron star mergers within 100 Mpc.