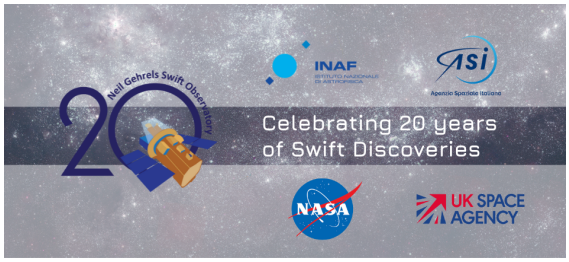

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Impact of Systematic Modeling Uncertainties on Kilonova Property Estimation

Tuesday 25 March 2025 17:30 (15 minutes)

Precision measurements of kilonova properties like ejecta mass, geometry, and velocity are critical to informing our understanding of neutron star mergers, the neutron star equation of state, and their contribution to the r-process enrichment of the universe. Estimates of these properties are highly model-dependent and often do not incorporate the systematic uncertainties due to unconstrained atomic, nuclear, and astro-physics. In this talk, I will explore the impacts of how underlying physical assumptions like atomic data, thermalization efficiency, and geometry affect inferred kilonova ejecta properties and their spectral/photometric evolution as well as the unique ability that Swift possesses to progress kilonova science. As more kilonovae are discovered by facilities like LSST and LIGO, early time UV/optical data will be vital to understanding the long-standing mysteries surrounding kilonovae such as the origins of each kilonova component and the connection between kilonovae and long GRBs, which can only be enabled by the rapid ToO response times and wavelength coverage of Swift.

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