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X-ray Burst Oscillations and NICER

Wednesday, February 8, 2017 11:00 AM (30 minutes)

Type I X-ray bursts are thermonuclear flashes observed from the surfaces of accreting neutron stars (NSs) in Low Mass X-ray Binaries. Oscillations have been observed during the rise and/or decay of some of these X-ray bursts. Those seen during the rise can be well explained by a spreading hot spot model, but large amplitude oscillations in the decay phase remain mysterious because of the absence of a clear-cut source of asymmetry. To date there have not been any quantitative studies that consistently track the oscillation amplitude both during the rise and decay (cooling tail) of bursts. In this talk I will discuss the results of our computations of the light curves and amplitudes of oscillations in X-ray burst models that realistically account for both flame spreading and subsequent cooling. I will discuss how the combination of the light curve and fractional amplitude evolution can constrain the properties of the flame spreading, such as ignition latitude, the flame spreading geometry and speed, and its latitudinal dependence which would be important for measuring NSs masses and radii using X-ray burst oscillations. I will also give an overview on the Neutron star Interior Composition Explorer (NICER) which is an International Space Station payload devoted to the study of neutron stars through soft X-ray timing, and is planned to launch in the spring of 2017. I will present the results of simulated X-ray bursts using NICER response, and will discuss the capabilities for NICER to detect and study burst oscillations.

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