

PHAROS Conference 2020: The multi-messenger physics and astrophysics of neutron stars



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Studying the Neutron Star Interior in Transient Low-Mass X-Ray Binaries

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I will present recent progress on our long-term study of the thermal response of neutron stars to long phase of accretion in low-mass X-ray binaries. During the accretion phase, the crust of the neutron star is strongly heated and most of this heat flows into the core. During the quiescence phase, the star relaxes back to thermal equilibrium and observation of this phase allows us to map the physical properties of the stellar crust. Long term evolution also gives information about the core properties as its neutrino emission efficiency and its specific heat. Evidence for very fast neutrino emission from a Direct Urca process has emerged in a few cases and recent constraints on the total stellar specific heat become comparable to theoretical expectations and may soon, with more data, provide relevant constraints on the nature of dense matter.

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