

Exploring the structure of neutron stars in low-mass X-ray binaries

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Transient low-mass X-ray binaries containing a neutron star which sporadically accrete matter from a low-mass companion provide a unique opportunity to study the internal structure of neutron stars. During accretion phase the neutron star is heated and driven out of thermal equilibrium. During the following quiescent phase, when no accretion is occurring, the thermal relaxation of the neutron star can, and has, been observed. Modelling of these sequences of accretion/heating and cooling has allowed to find evidence for extremely fast neutrino emission in the neutron star core by the Direct Urca process, and to put constraint on the specific heat of the core. Several properties of the neutron star crust are also naturally being constrained, as its thermal conductivity and specific heat, and possibly the presence of neutron superfluid.

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