Scientific report on the workshop

"ICONS: Investigating Crusts of Neutron Stars"

held in Amsterdam on 15-17 April 2019

During the first day of the workshop we focused on the constraints we have so far obtained from observations and theory about how neutron star crusts are heated up (due to accretion or due to magnetar outbursts) and how they then cool down after these events. One of the enigmas in this research field is the unknown process behind the so-called 'shallow heating mechanism' during outburst and this topic was the main focus of the moderated discussion in the afternoon. Several new ideas were put forwards that will lead to new investigations in the near future.

The second day we focused on the nuclear reactions taking place in and on the accretion neutron stars. A particular highlight was the presentation by Marcella Wijngaarden about a previous neglected process called "diffuse nuclear burning" that can happen even when accretion has stopped and therefore can have a major impact in our heating and cooling studies of accreting neutron stars.

On the final day we focused om the impact of our uncertainties in the crustal microphysics on our studies, and then in particular the magnetic field and the nuclear pasta expected deep in the crust. The main focus was to try to identify observational signatures of these effects and several were brought forward.

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