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



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## Unified description of magnetar crusts

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With their ultra-strong magnetic fields and densities exceeding that found inside heavy atomic nuclei, magnetars offer unique possibilities to study matter under extreme conditions that cannot be reproduced in the laboratory. We have determined the equilibrium properties of magnetar crusts taking into account the Landau-Rabi quantization of electron motion. Both the outer and inner crusts were treated consistently within the framework of the nuclear-energy density functional theory using functionals that were precision-fitted to theoretical and experimental data. Calculations were carried out for a wide range of magnetic-field strengths required for modelling astrophysical phenomena.

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