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Systematic calculations of nuclear abundances in magnetar crusts

The electromagnetic observations following the detection of gravitational waves from GW170817 by the LIGO-Virgo collaboration, have confirmed the occurrence of an r-process nucleosynthesis triggered by the decompression of ejected crustal materials from binary neutron star mergers. Magnetars - strongly magnetised isolated neutron stars - might be another astrophysical site for the r-process, matter being ejected during giant flares induced by magnetic-field reconfigurations. The outer crust is expected to be the main contributor to the ejected material and the final abundance distribution depends on its composition. We present a systematic study of the influence of the magnetic field on the composition of the outer crust of a magnetar for a wide range of magnetic-field strengths.

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