Nuclear Abundances in the Crust of Magnetars

Zh.K. Stoyanov[1], **Y.D. Mutafchieva**[1], **N. Chamel**[2], **L.M. Mihailov**[3]

[1]Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, 72 Tsarigradsko Chaussee, 1784 Sofia, Bulgaria
[2]Institute of Astronomy and Astrophysics, Université Libre de Bruxelles, CP 226, Boulevard du Triomphe, B-1050 Brussels, Belgium
[3]Institute of Solid State Physics, Bulgarian Academy of Sciences, 72 Tsarigradsko Chaussee, 1784 Sofia, Bulgaria

The r-process nucleosynthesis triggered by the decompression of ejected crustal materials from binary neutron star mergers has been recently confirmed by electromagnetic observations following the gravitational-wave event GW170817. Strongly magnetised isolated neutron stars, so called magnetars, might be another astrophysical site for the r-process since some material is also ejected during giant flares. The final abundance distribution depends on the crustal composition. Making use of the latest experimental nuclear mass data supplemented with microscopic models, we calculate the nuclear abundances of the different layers.

Acknowledgements. This work was supported by the National programme "Young scientists" funded by the Bulgarian Ministry of Education and Science, Fonds de la Recherche Scientifique (Belgium).