Effects of strong magnetic fields on the equation of state of cold non-accreting neutron-star crusts

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Abstract. Neutron stars are among the most strongly magnetized objects in the Universe with magnetic fields as high as $\sim 10^{15}$ G in soft-gamma repeaters and anomalous X-ray pulsars [1]. Even stronger fields might exist in the interior of these stars. We have determined the equilibrium structure of the outer crust of cold non-accreting neutron stars endowed with strong magnetic fields in the framework of the magnetic BPS model [2]. We have made use of the most recent experimental atomic mass data [3] complemented with a microscopic mass model based on the Hartree-Fock-Bogoliubov method [4]. The equation of state is found to be markedly affected by the Landau quantization of electron motion.

References

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