Heating and cooling of magnetars with accreted envelopes

A. D. Kaminker[1], A. Y. Potekhin[1], D. G. Yakovlev[1], G. Chabrier[2]

[1]Ioffe Physical Technical Institute, Politekhnicheskaya 26, 194021 St. Petersburg, Russia

[2]Ecole Normale Superérieure de Lyon, CRAL (UMR 5574 CNRS), 46 allée d'Italie, 69364 Lyon, France

We study the thermal structure and evolution of magnetars as cooling neutron stars with a phenomenological heat source in a spherical internal layer. We focus on the effect of highly magnetized ($B \gtrsim 10^{14}$ G) non-accreted and accreted envelopes composed of different elements, from iron to hydrogen or helium, taking into account neutrino emission from all layers. We calculate the cooling of magnetars with a dipole magnetic field for various locations of the heat layer, heat rates and magnetic field strengths. The joint effects of the super-strong magnetic fields and accreted envelopes simplify the interpretation of observations of magnetars as neutron stars with a heat source that is located at densities $\rho \lesssim 4 \times 10^{11}$ g cm^{-3} and has the heat intensity $W^{\infty} \sim 10^{36} - 10^{37}$ erg s^{-1}.

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