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Investigation of the magneto-thermal evolution in a magnetar's crust

Assuming that the timescale of the magnetic field decay is approximately equal to that of the stellar cooling via neutrino emission, we calculate the effective soft X-ray luminosity emitted from the surface of a magnetar. The three heating mechanisms of the magnetic-plastic flow, the magnetic domain and Ohmic decay powered by toroidal magnetic fields inside a magnetars's crust are investigated and the related comparisons are presented.

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