Thermal radiation of magnetars

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

[1] *Ioffe Institute, Russia*
[2] *Central Astronomical Observatory at Pulkovo, Russia*

We discuss thermal structure of magnetars as highly magnetized warm neutron stars with internal heat sources in their crust. Magnetars exhibit strong persistent thermal and non-thermal high-energy emission and demonstrate a variety of specific transient events such as long-term outbursts, X-ray and gamma-ray bursts and flares, glitches, *etc.* Still wider family of active compact objects contain possibly not only magnetars but high-B pulsars and the so called "hidden" magnetars, *i. e.* neutron stars with ultra-strong magnetic field screened by a fall-back material as a consequence of supernova explosions. We follow the concept that these sources are powered by persistent and/or variable internal heaters. When the magnetically triggered heaters are on, neutron stars behave as magnetars, but when they are off or weak, the stars behave as pulsars or as low-level persistent compact X-ray sources. We analyze spreading of heat from the heat source for different heat-source locations, geometries and heat intensities using two and one dimensional cooling codes, and formulate the conditions under which the generated heat can be efficiently transported to the surface and emitted there as intense X-ray radiation.

kam@astro.ioffe.rssi.ru