Understanding anomalous X-rayy pulsars in the SGR1806-20 post-hyperflare era

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ABSTRACT: It was 12 years ago when a small sample of peculiar soft X–ray pulsars were suggested to be a different manifestation of the large neutron star zoo: these sources are now better known as Anomalous X–ray Pulsars. They are currently believed to possess extremely high magnetic fields which power the X–ray emission, and are thus also called MAGNEtic sTAR candidates. In the latest years many new observational properties have been assessed, which changed completely our view of AXPs, in great extent thanks to the new generation instruments and theoretical effort. It is now evident that the multiwavelength phenomenology of AXPs/SGRs is more complex than thought before. In this talk I will review the recently identified properties of AXPs comparing them with those of Soft γ-ray Repeaters, with which AXPs are thought to be related at some level. A number of special cases which helped us in better understanding the class will be presented and discussed. Among others are the 27th December 2004 hyperflare from SGR1806–20 and the transient AXP XTEJ1810-197. Finally, a comparison with other classes of isolated neutron stars, such as CCOs and XDINSs and radio pulsars will be attempted.