

Rare magnetar discovered in the vicinity of a supernova remnant

December 12 2013

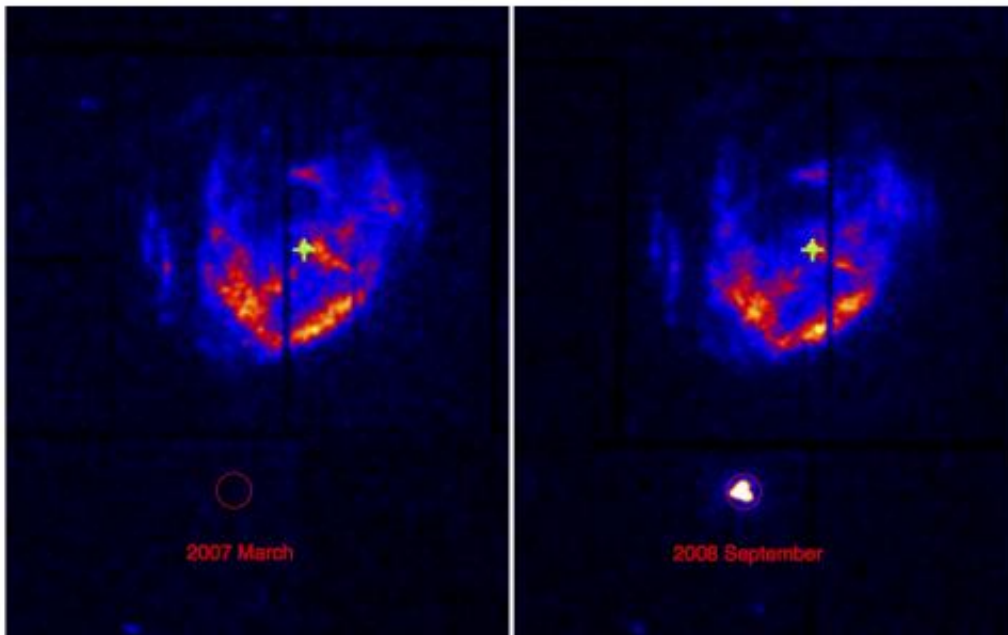


Image of the supernova remnant Kesteven 79 and the newly discovered magnetar, 3XMM J185246.6+003317, in X-rays obtained with the XMM-Newton telescope. Since X-rays are invisible to the human eye, the brightness of the gas in X-rays is represented by the colors blue, red and yellow. The red circle and the green cross indicate the location of the transient magnetar and the anti-magnetar, respectively. The transient magnetar was not present in the 2007 image (left), but appears in the 2008 image (right). Credit: Zhou et al. 2014

A team of astronomers led by the PhD student Ms. Ping Zhou from the University of Nanjing in China discovered a new transient magnetar.

This magnetar, the ninth of its class, was identified during a COSPAR Capacity Building Workshop for young researchers in developing countries. It is likely that the magnetar, an ultra-magnetic neutron star, was part of a binary star system together with an anti-magnetar. The results of this research will be published in the *Astrophysical Journal Letters*.

When a heavy star comes to the end of its life in a [supernova explosion](#) a neutron star or a black hole is formed. A transient magnetar is a neutron star with an ultra-strong magnetic field that suddenly starts shining and then fades away slowly. Only 8 such magnetars were known before Ms. Zhou's discovery.

During the COSPAR training workshop Zhou studied the nearby supernova remnant SNR Kesteven 79. Using X-ray images from ESA's X-ray telescope XMM-Newton from 2008 and 2009 she discovered a bright source south of the supernova remnant that was not visible in previous observations made from 2001 to 2007. Ping Zhou:

"Discovering a new object, especially such a peculiar one, was the best thing that happened in my career. Since primary school I had the dream of discovering a new star."

The newly discovered magnetar 3XMM J186536.6+003317 pulses with X-rays every 11.56 seconds and, therefore, has the longest rotation period among all known transient magnetars. The distance to the magnetar indicates that there is a likely connection between this object, the supernova remnant and the anti-magnetar that is located at the center of supernova remnant. It is possible that both stars were members of a binary system that was disrupted during the supernova explosion.

COSPAR is the international Committee on Space Research, and the COSPAR Capacity Building Workshops have been developed specifically for young researchers in developing countries. Co-author

Mariano Mendez from the University of Groningen in The Netherlands, chair of COSPAR's Panel on Capacity Building, supervised the workshop that took place in China in September 2013. Mariano Mendez: "All data and software that is used to train research skills are freely available, but students have to learn how to use them. In this way we help them with their first, often most difficult steps. Zhou's fantastic discovery shows that these workshops meet our goals!"

More information: "Discovery of the transient magnetar 3XMM J185246.6+003317 near the supernova remnant Kesteven 79 with XMM-Newton," Ping Zhou, Yang Chen, Xiang-Dong Li, Samar Safi-Harb, Mariano Mendez, Yukikatsu Terada, Wei Sun, Ming-Yu Ge, accepted for publication in the *Astrophysical Journal Letters*, arxiv.org/abs/1310.7705

Provided by Netherlands Research School for Astronomy

Citation: Rare magnetar discovered in the vicinity of a supernova remnant (2013, December 12) retrieved 19 April 2024 from <https://phys.org/news/2013-12-rare-magnetar-vicinity-supernova-remnant.html>

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