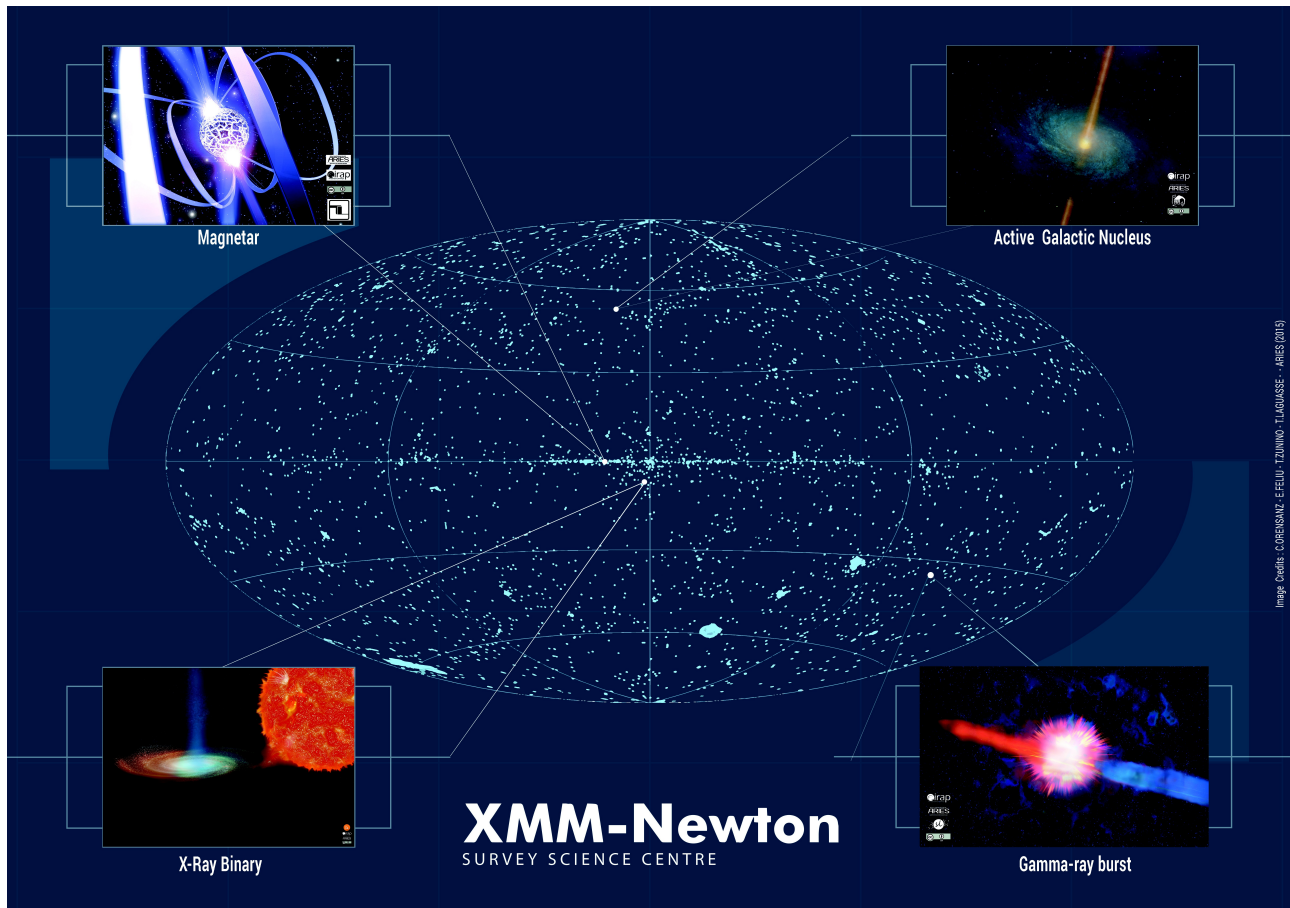


A new version of the largest catalogue of X-ray detected astrophysical objects

The fifth data release of the XMM-Newton serendipitous source catalogue (3XMM-DR5), the largest catalogue of X-ray sources ever created, contains 565 962 X-ray detections, ranging from nearby objects in our Solar System to supermassive black holes at the edge of the Universe. For each detection, a wealth of information is provided to help understand the nature of the object and as a result, many new and extreme astrophysical objects will be discovered.



Sources that are bright in X-ray light are amongst the most energetic in the Universe. The European Space Agency's highly sensitive XMM-Newton X-ray observatory detects 50-100 X-ray sources in a region of the sky that is the same size as the full moon, and there are around 600 such observations per year. Many of the detections turn out to be objects that have never previously been observed.

The X-ray sources in the XMM-Newton serendipitous source catalogue are objects such as supermassive black holes guzzling the gas and dust that surrounds them in the centres of galaxies, exploding stars and dead stars that have collapsed to tight balls of exotic material that are as dense as the atomic nucleus and rotate up to 1000 times per second. However, new and exotic objects are expected to be found, based on results from previous smaller versions of the catalogue.

Indeed, during the methodical data validation phase, two new extreme binary systems, known as polars were discovered. These systems contain a star like our Sun and the remains of a star that has collapsed into a 'white dwarf'. The two objects orbit each other (much like the Earth and the Moon) and the white dwarf is so dense (1 million times the density of water!) that it

has a huge gravitational field, which strips the outer layers from its companion star. This gas and dust gets caught in the white dwarf's extra-strong magnetic field (ten million times stronger than the Earth's magnetic field) causing it to heat up and radiate strongly in the X-ray domain. In the extreme case, it is possible that so much matter can fall onto the white dwarf that it would no longer be able to support its own weight, therefore these objects are progenitors for type 1 supernova explosions. These explosions allow astronomers to measure the distance to remote objects in the Universe.

Natalie Webb from the Institut de Recherche en Astrophysique et Planétologie (IRAP, Toulouse, France) who is responsible for the XMM-Newton Survey Science Centre that produces the catalogue enthuses, "This is just the tip of the iceberg – there are many more new and exciting objects waiting to be discovered in the catalogue!".

In order for scientists to make the most of the catalogue, a scientific paper submitted to the European Journal Astronomy and Astrophysics, written by the XMM-Newton Survey Science Centre consortium, describing the catalogue and its products accompanies the release of this prestigious catalogue, along with a new version of the XMM-Newton Survey Science Centre webpages, <http://xmmssc.irap.omp.eu>

The XMM-Newton Survey Science Centre, led by Dr. Natalie Webb at the IRAP, is a consortium of the following institutions:

Institut de Recherche en Astrophysique et Planétologie, Toulouse, France

Service d'Astrophysique, CEA/DSM/IRFU, Saclay, France

Observatoire Astronomique de Strasbourg, France

Leibniz-Institut für Astrophysics Potsdam (AIP), Germany

Max-Planck Institut für extraterrestrische Physik, Garching, Germany

University of Leicester, United Kingdom

Mullard Space Science Laboratory, University College London, United Kingdom

Institute of Astronomy, Cambridge, United Kingdom

Instituto de Fisica de Cantabria, Santander, Spain

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Resources:

The XMM-Newton Survey Science Centre webpages and catalogue access:

<http://xmmssc.irap.omp.eu/>

The paper describing the catalogue: 'The XMM-Newton serendipitous survey VI. The third XMM-Newton serendipitous source catalogue', S. R. Rosen, N. A. Webb, M. G. Watson et al., A&A, submitted. See astro-ph: <http://arxiv.org/abs/1504.07051>