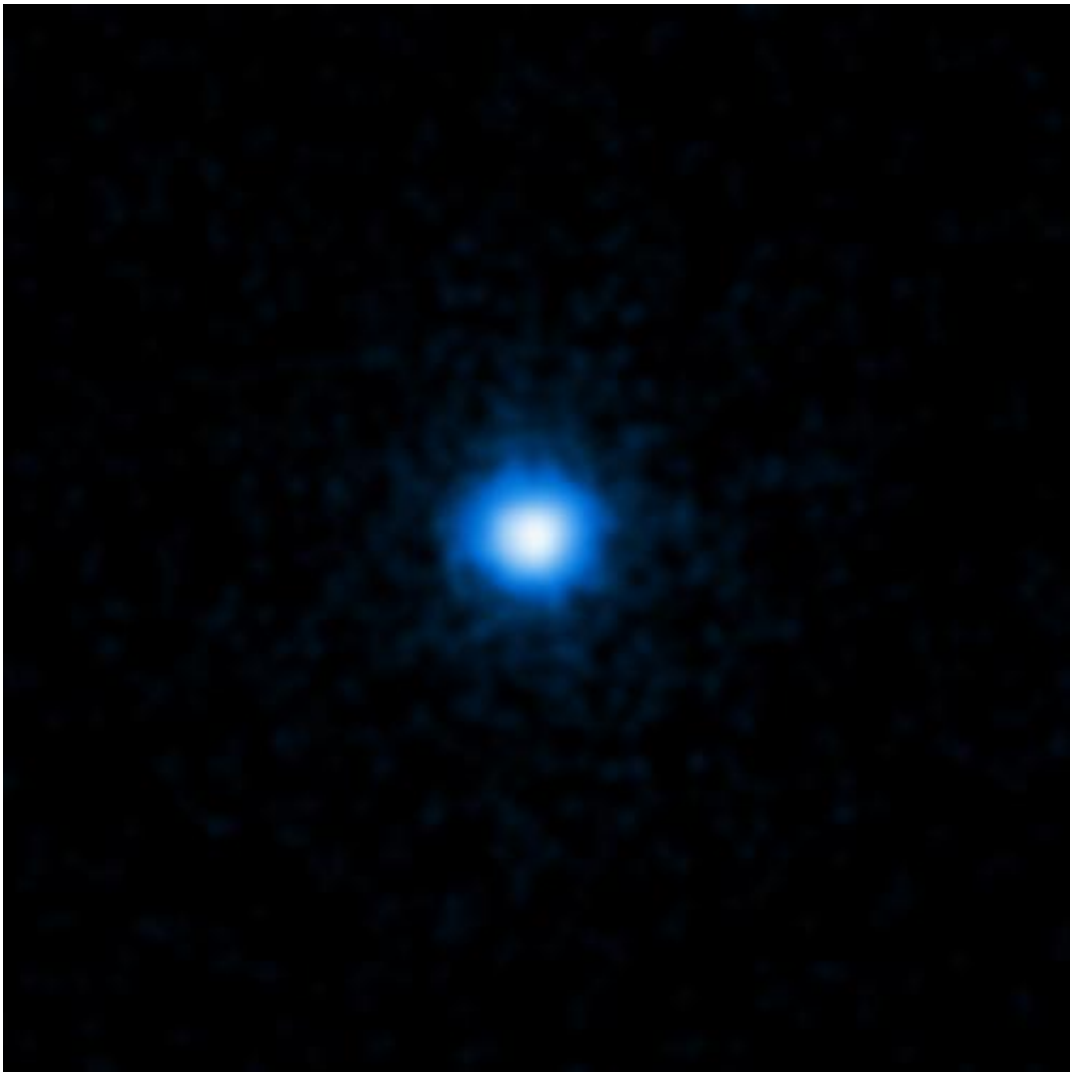
Chandra observes extraordinary event

April 8 2011



Credits: NASA/CXC/Warwick/A.Levan et al.

(PhysOrg.com) -- Chandra observation confirms the association of GRB

110328A with the core of a distant galaxy.

The center of this image contains an extraordinary gamma-ray burst (GRB) called GRB 110328A, observed with NASA's Chandra X-ray Observatory. This Chandra observation confirms the association of GRB 110328A with the core of a distant galaxy and shows that it was an exceptionally long lived and luminous event compared to other GRBs.

The red cross (roll your mouse over the image above) shows the position of a faint galaxy -- located about 3.8 billion light years from Earth -- observed with NASA's Hubble Space Telescope and the Gemini-North telescope on the ground. Allowing for experimental errors, the position of the galaxy is indistinguishable from that of the X-ray source, showing that the source is located close to the middle of the galaxy. This is consistent with the idea, suggested by some astronomers, that a star was torn apart by a supermassive black hole at the center of the galaxy. This idea differs from the usual interpretation for a GRB, involving the production of a jet when a black hole or neutron star forms after the collapse of a massive star or a merger between two neutron stars.

Remarkably, this "tidal disruption" event may have been caught in real time, rather than detected later from analyzing archival observations. However, this X-ray source is about a hundred times brighter than previously observed tidal disruptions. One possible explanation for this very bright radiation is that debris from the disrupted star fell towards the black hole in a disk and the swirling, magnetized matter generated intense electromagnetic fields that created a powerful jet of particles. If this jet is pointed toward Earth it would boost the observed brightness of the source. This scenario has already been suggested by observers to explain the bright and variable X-ray emission observed by NASA's Swift telescope.

This observation was part of a so-called target of opportunity, or TOO,

led by Andrew Levan from the University of Warwick in the UK. A TOO allows the telescope to react quickly to unpredictable cosmic events, within 24 hours in some situations. Chandra scientists and engineers can decide to alter the scheduled observations and instead point the telescope to another target if the circumstances warrant it. This process was put into place once the discovery of GRB 110328A with Swift was announced on March 28th, 2011. The Chandra team was able to reset the telescope's schedule to observe GRB 110328A early in the morning of Monday, April 4th for a period of just over four hours.

Source: Chandra X-ray Observatory

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