A bright off-nuclear X-ray source: CXO J122518.6-144545

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A bright off-nuclear X-ray source

HST ACS g’-band observation

A bright off-nuclear X-ray source

5 arcsec

5 ks Chandra observation
Blue optical candidate counterpart

HST ACS $g'$-band and $z'$-band observation
Background AGN?

\[ g'-z' \approx 0.7 \pm 0.5 \]  
\( \text{Anderson et al. 2007} \)

- background AGN, assume \( PL=1.9 \)
- add extinction due to galaxy of \( 5 \times 10^{21} \text{ cm}^{-2} \)

\[ g'-z' \approx -1.3 \]
Late time SN Type II\textsubscript{n}?

cf Fabio Pizzolato's talk yesterday on N10

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption{figure from Pooley}
\end{figure}

CXOJ1225 $\rightarrow$ HST June 2003; Chandra Feb 2008

Scenario
Late time SN Type IIn?

Scenario

SN2005kd: blue for the Type IIn class (Tvetkov 2008)
HST blue pre-explosion SN Type IIIn?

Exploding LBV?

ULX? bright in opt & X-ray

Scenario
Recoiling SMBHs: candidates

Scenario

From Komossa, Zhou, Lu 2008
See also Shields et al. 2009, Boroson & Lauer 2009; Civano et al. 2010
2\textsuperscript{nd} epoch Chandra & HST obs

Handle on the X-ray spectrum

Nuclear X-ray activity?

Variability opt & X-ray

General: optical spectroscopy

Answers
Other interesting sources

SDSS DR7
ra: 181.162 dec: 1.798
scale: 0.1981 arcsec/pix
image zoom: 4:1

SDSS DR7
ra: 164.165 dec: 7.122
scale: 0.1981 arcsec/pix
image zoom: 4:1

Answers
Conclusions:

CXOJ1225 is a bright ULX; its nature is currently uncertain.

Some bright off-nuclear sources could be recoiling or ejected SMBHs accreting from a star from the NST or in a GC (cf. Irwin et al. 2010, NGC 1399).

It will be difficult to distinguish between recoiling and infalling (S)MBHs (cf. ESO 243-49; Sean Farrell’s Talk; Soria et al. 2010).
Astronomers at the European Space Agency (ESA), led by Marianne Heida, an undergraduate student at the University of Utrecht, found an empty void and not just some dense clouds of gas that prevent light from passing through; that was by using the infrared technology from Herschel Telescope, which is several times larger than the Hubble telescope.

Interesting press coverage
Herschel Telescope found a giant moving black hole

from ecPulse.com