



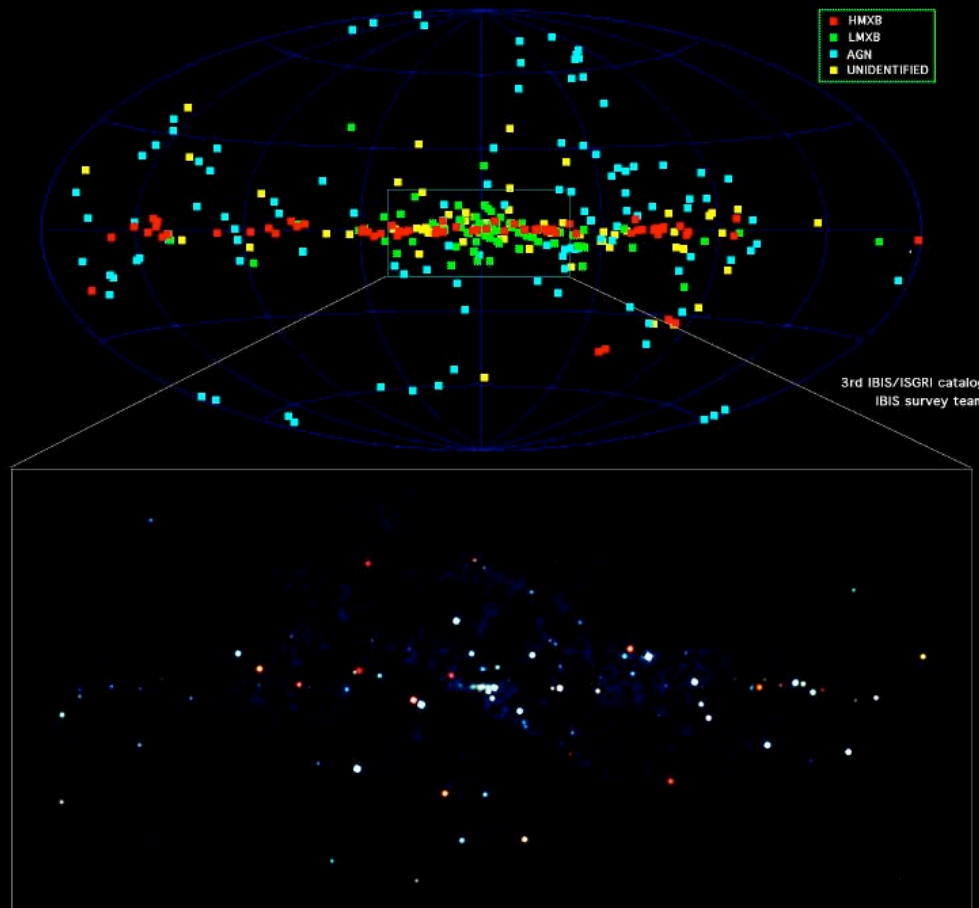
Prospects for Swift studies on X-ray binaries and AXPs/SGRs

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Osservatorio astronomico di Brera



Hard X-ray sky



• LMXRB

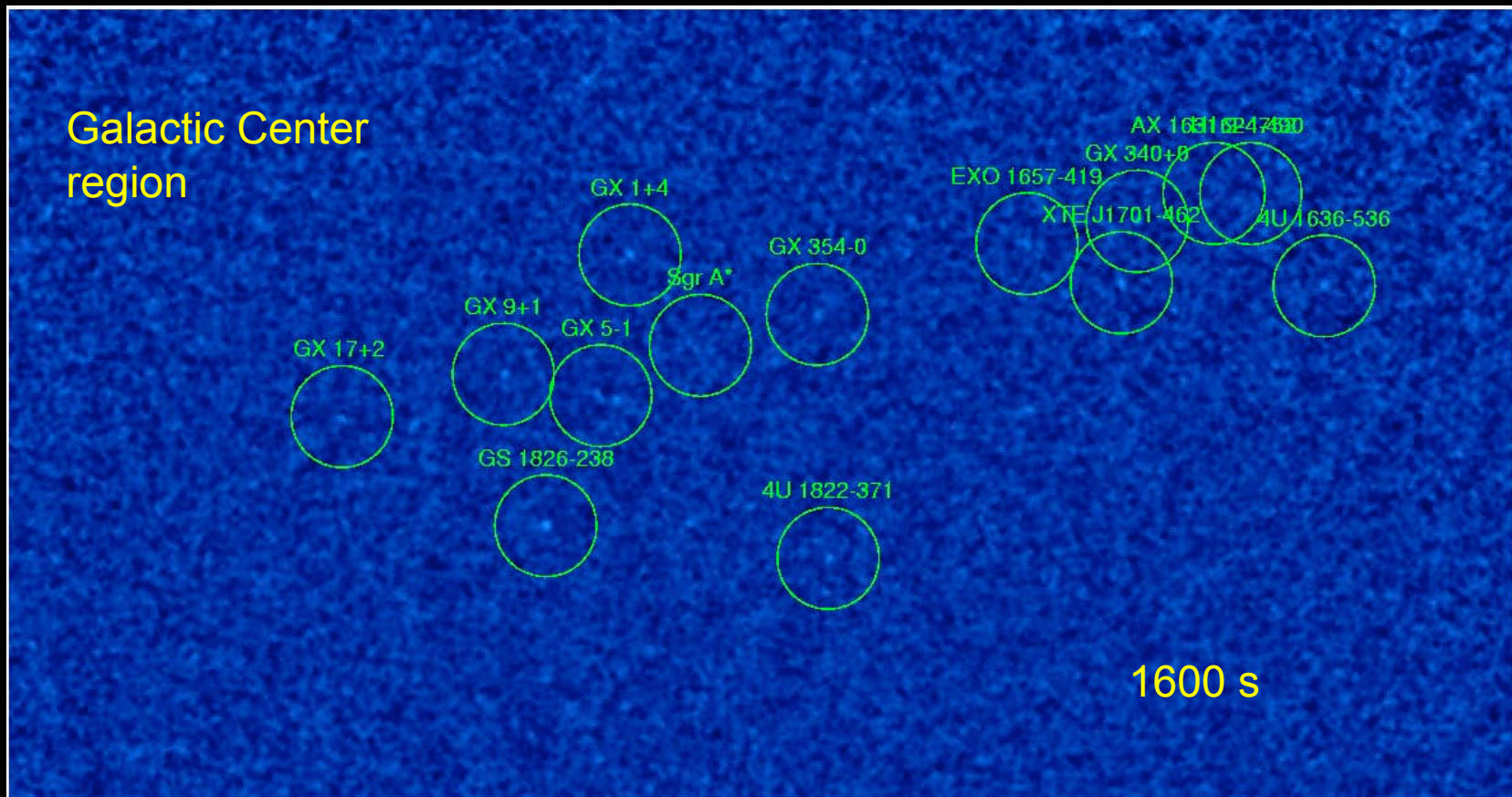
• HMXRBs

INTEGRAL's
view

State College May 2007

Swift's strengths (XRB-I)

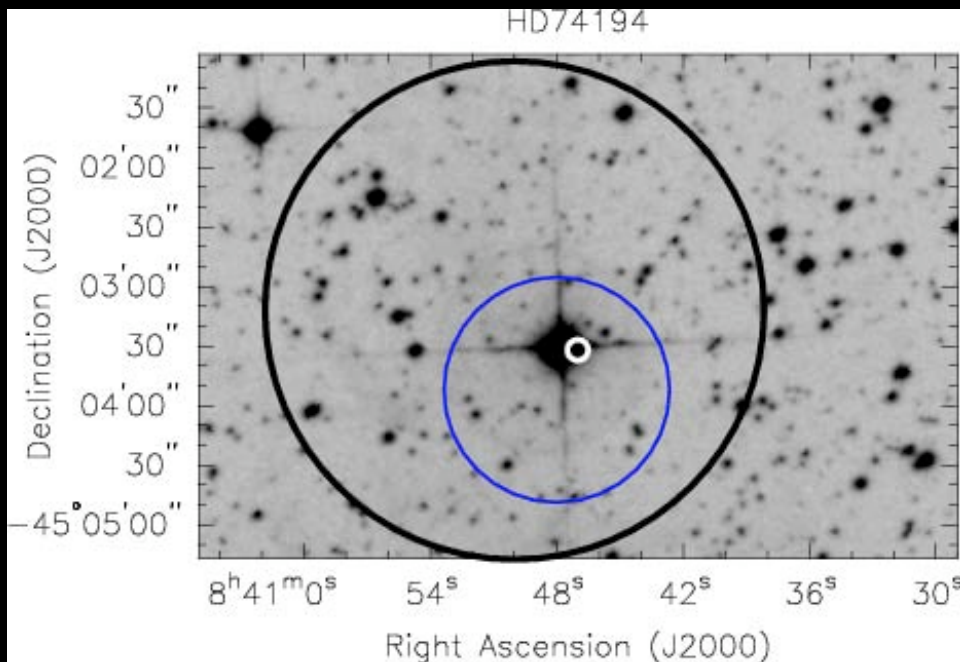
BAT monitoring of the X-ray sky (about 100 sources detected daily). BAT is able to discover new X-ray transient and follow them during the brightest part of the outburst. Daily 1 ks observation of the Gal. Center.



Swift's strengths (XRB-II)

Thanks to its scheduling flexibility ideal instrument to perform short exposures to identify and to provide an accurate localization of hard X-ray sources (e.g. INTEGRAL, RXTE, Swift-BAT) as well as past and present X-ray missions (RASS, ASCA and XMMSL).

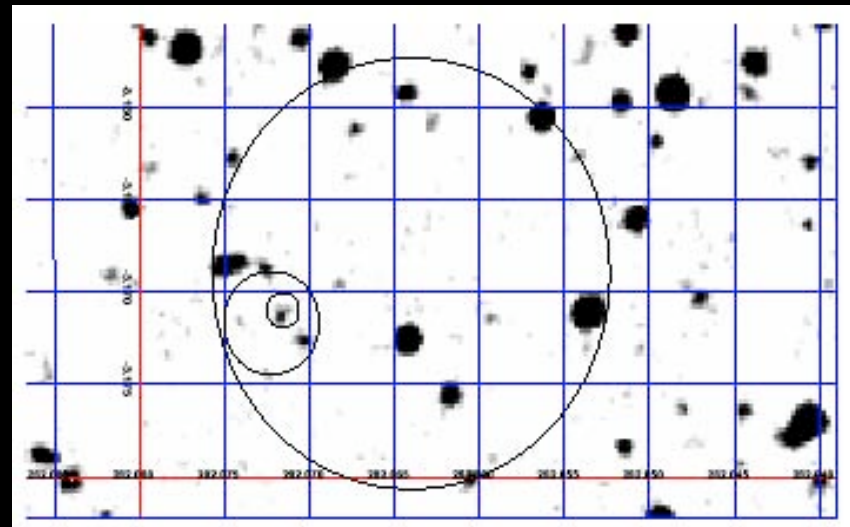
IGR J08408-4503



Leyder et al. 2007

ISGRI
JEM-X
Swift-XRT

IGR J18483-0311

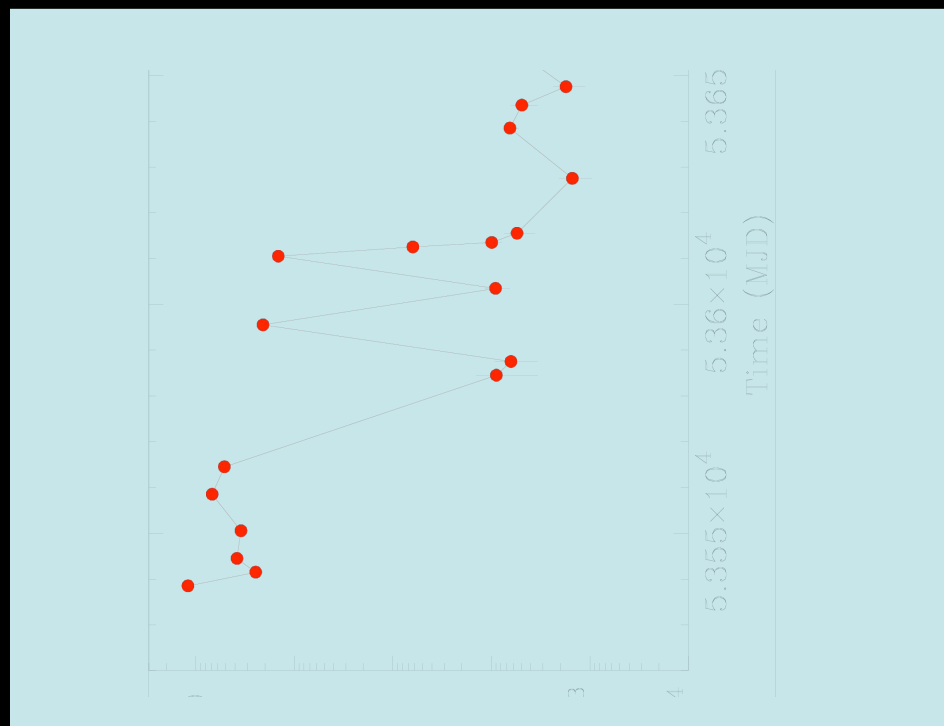
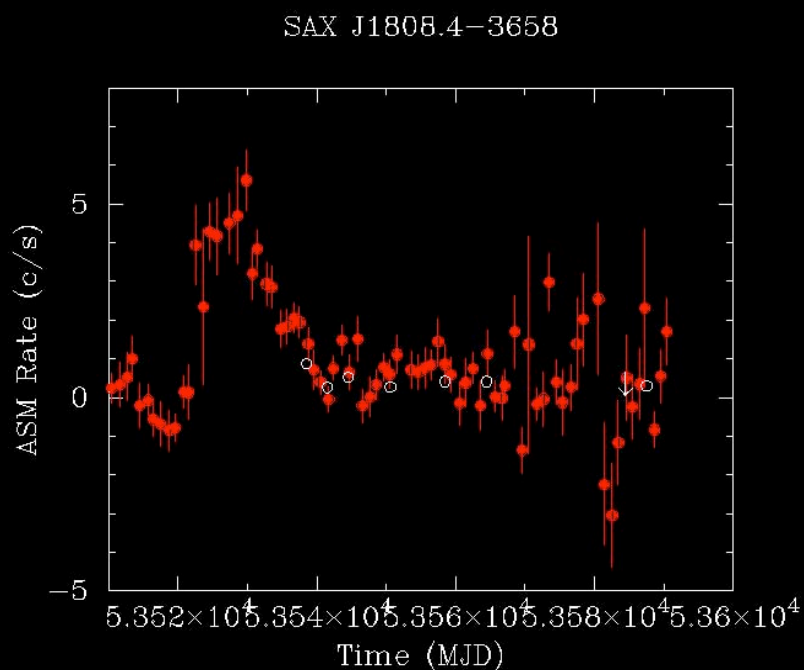


INTEGRAL
ROSAT
Swift-XRT

Sguera et al. 2007

Swift's strengths (XRB-III)

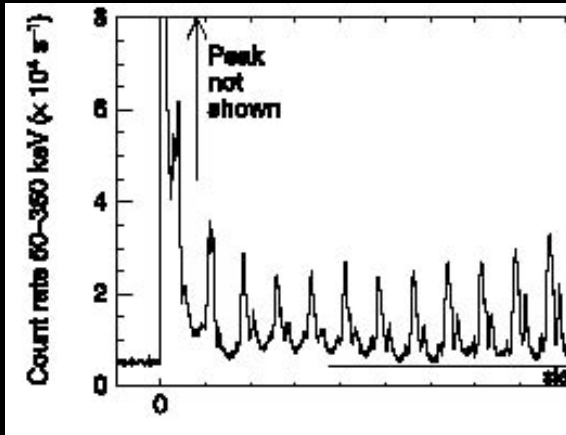
Thanks to its scheduling flexibility ideal instrument to perform (loose) monitoring of transient X-ray binaries.



Campana et al. 2007a

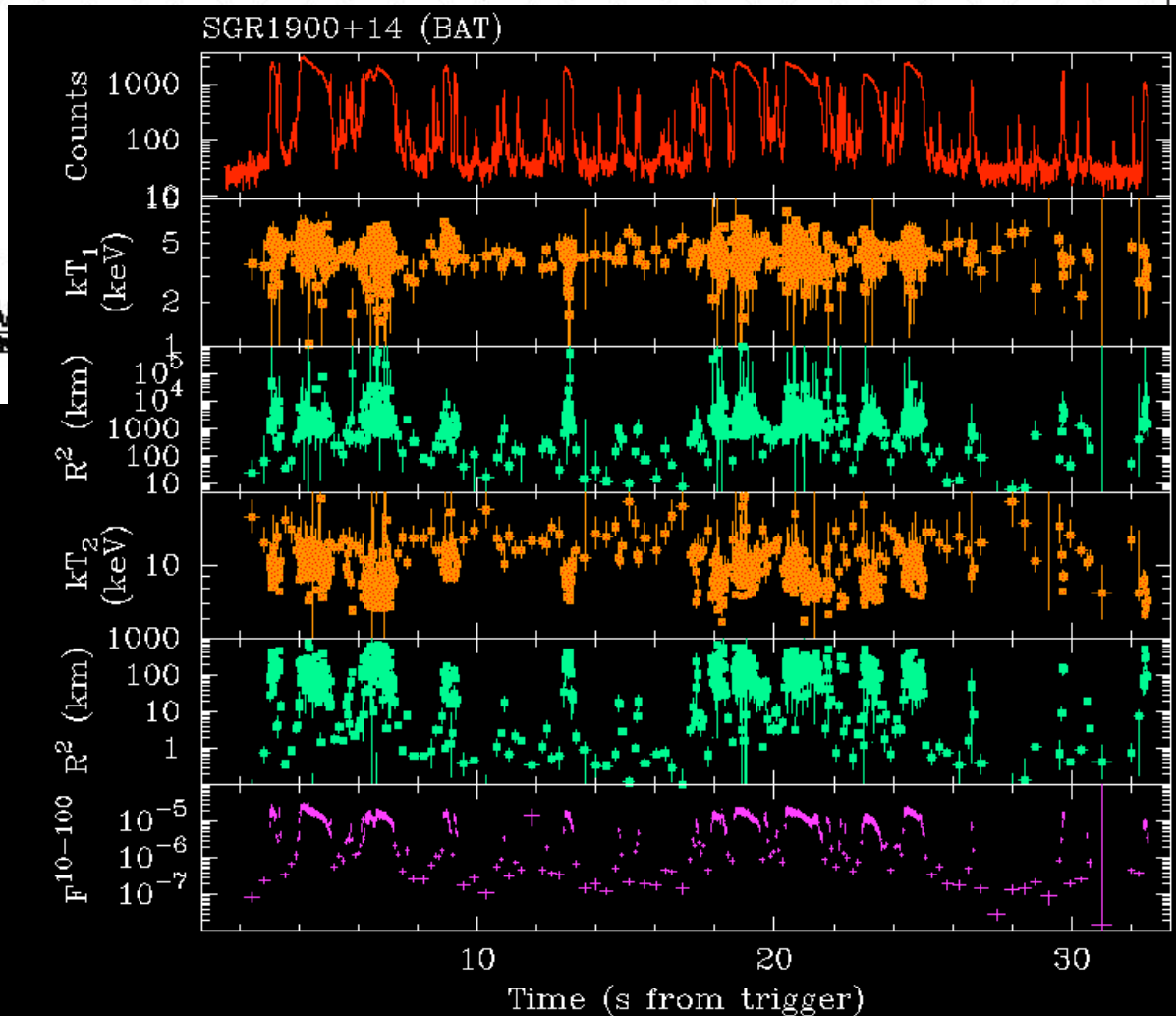
Swift's strengths (SGR)

Giant SGR1806-20 outburst



Palmer et al. 2006

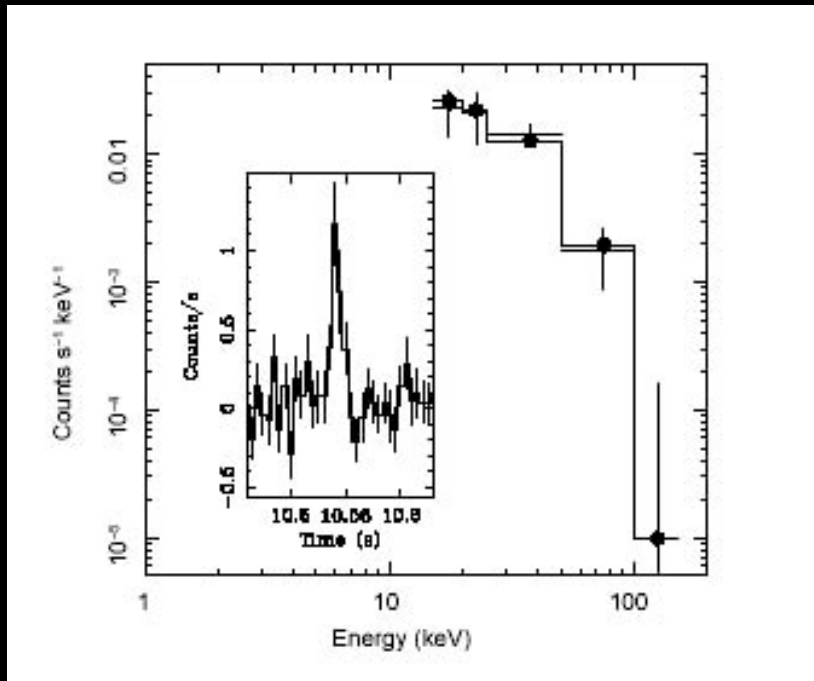
Pointed observations
on SGR 1900+14
during a period of
activity



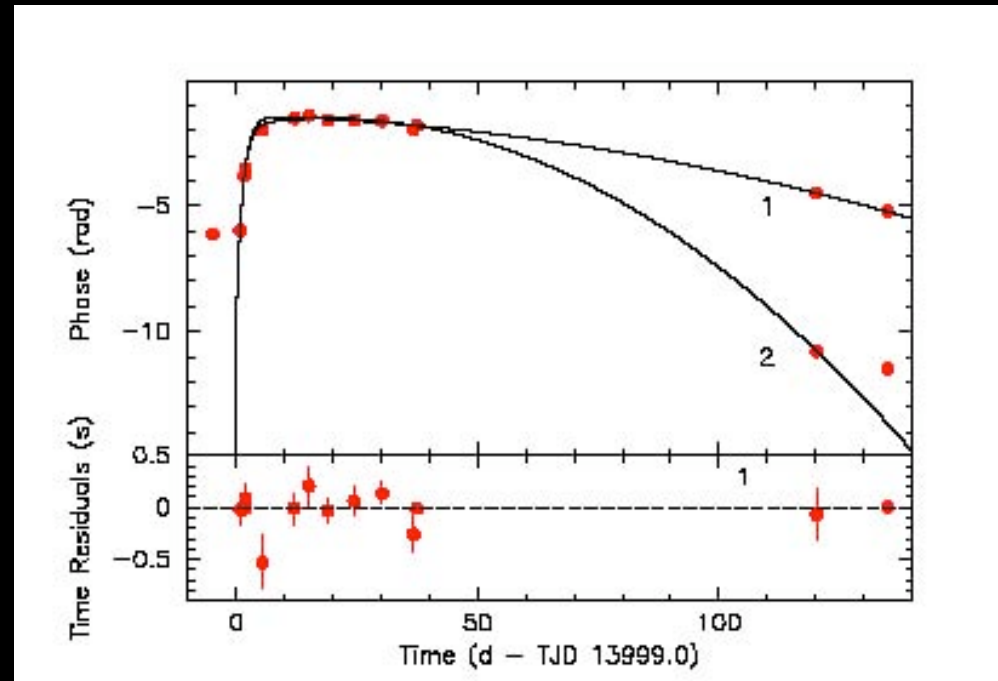
Israel et al. 2007a

Swift's strengths (AXP)

CXOU J164710.2-455216 in Westerlund 1



Discovery of a burst
with BAT

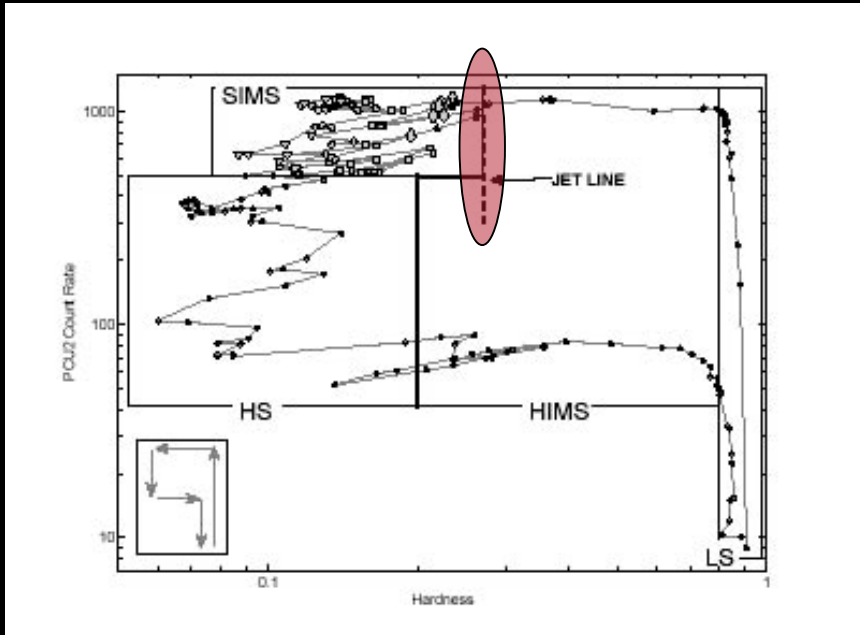


Monitoring with XRT,
discovery of a timing glitch

Swift future: XRB

- Broad band capabilities: UVOT – XRT – BAT:
monitor X-ray binary transient state changes, launch of micro-jet and jets
- X-ray burst statistics
- Detect in real time and follow superbursts
- Follow fast transient outbursts
- Follow transient outbursts down to quiescence

State transitions

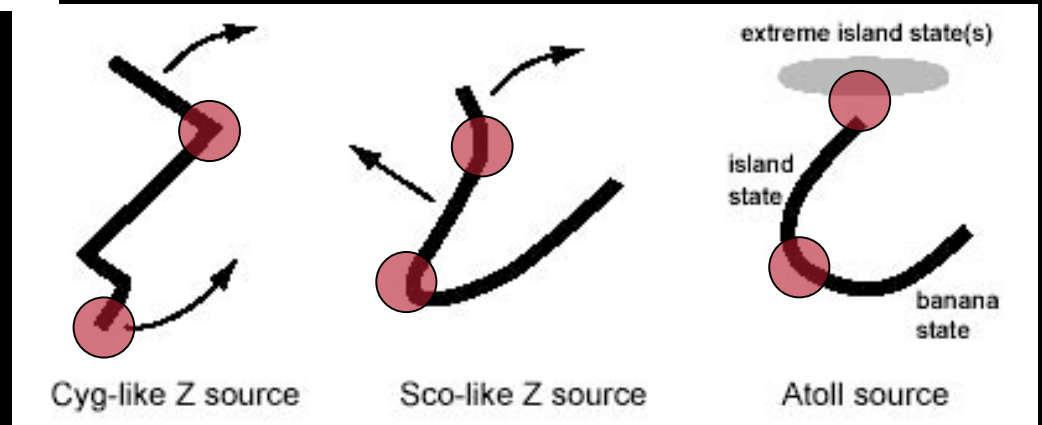


BH XRB

Belloni 2007

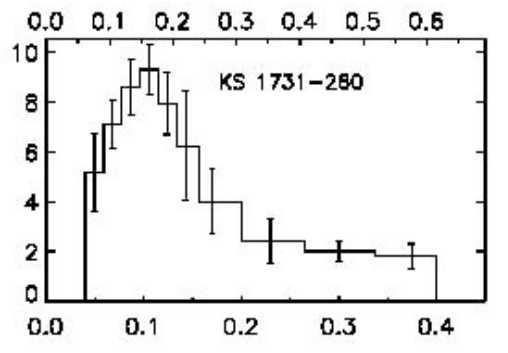
NS XRB

Homan et al. 2007



X-ray burst studies & statistics

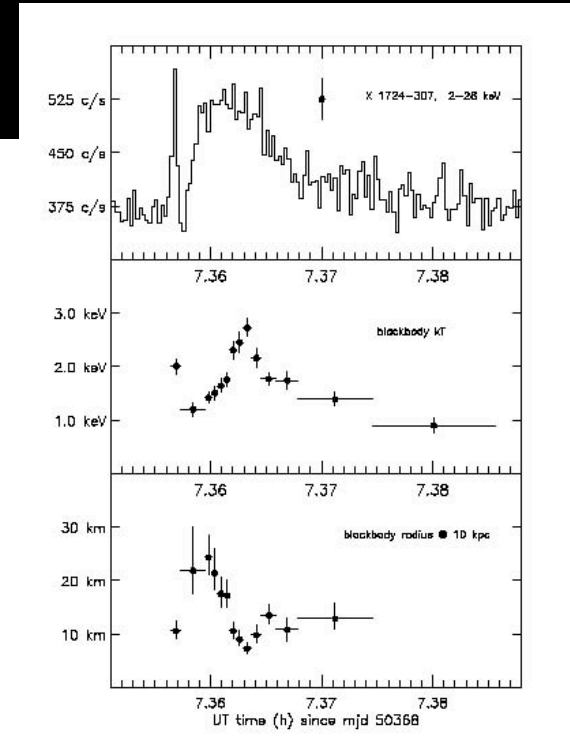
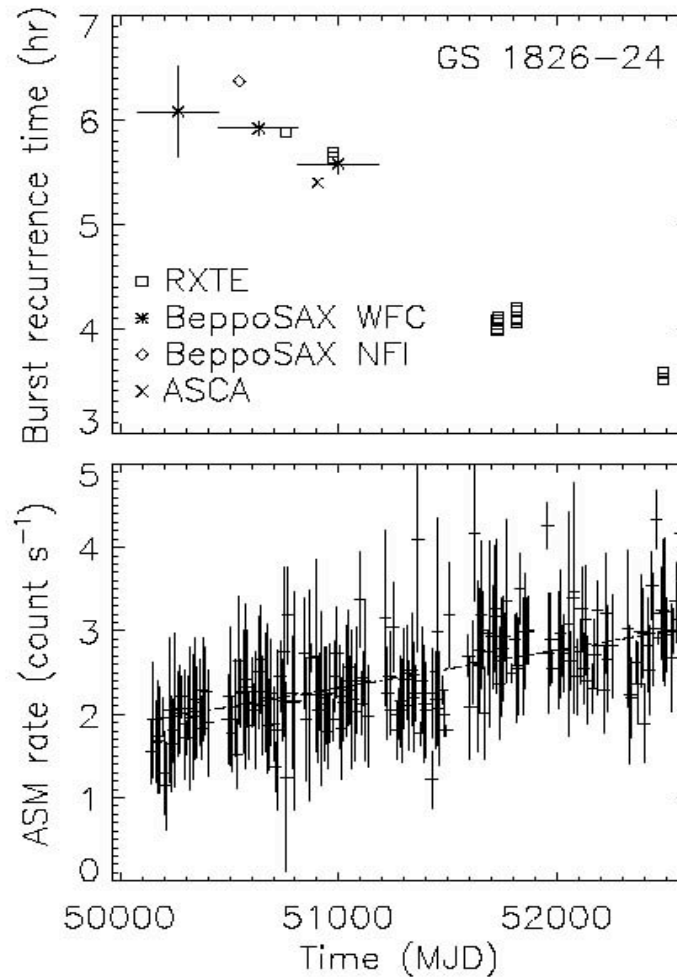
Cornelisse et al. 2003



Burst rate as a function of flux

Galloway et al. 2004

Periodic behaviour as a function of flux

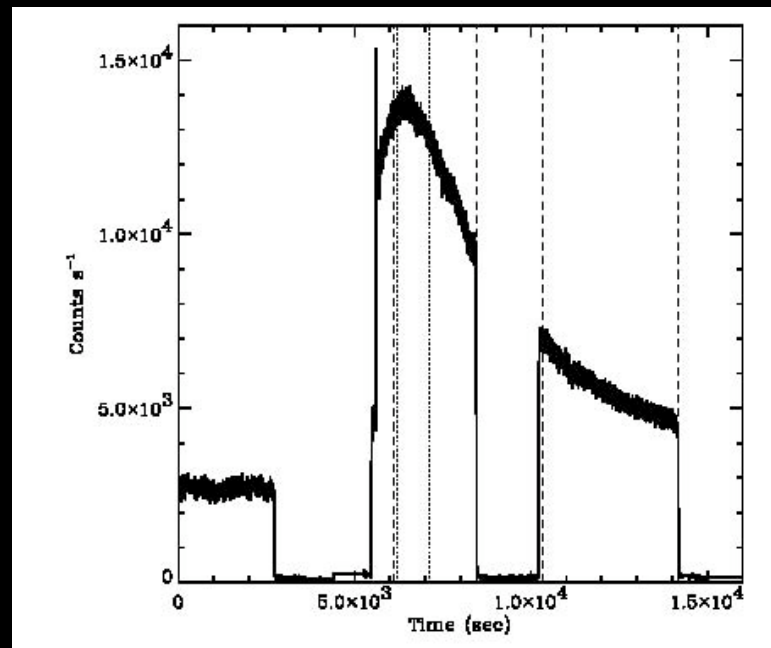
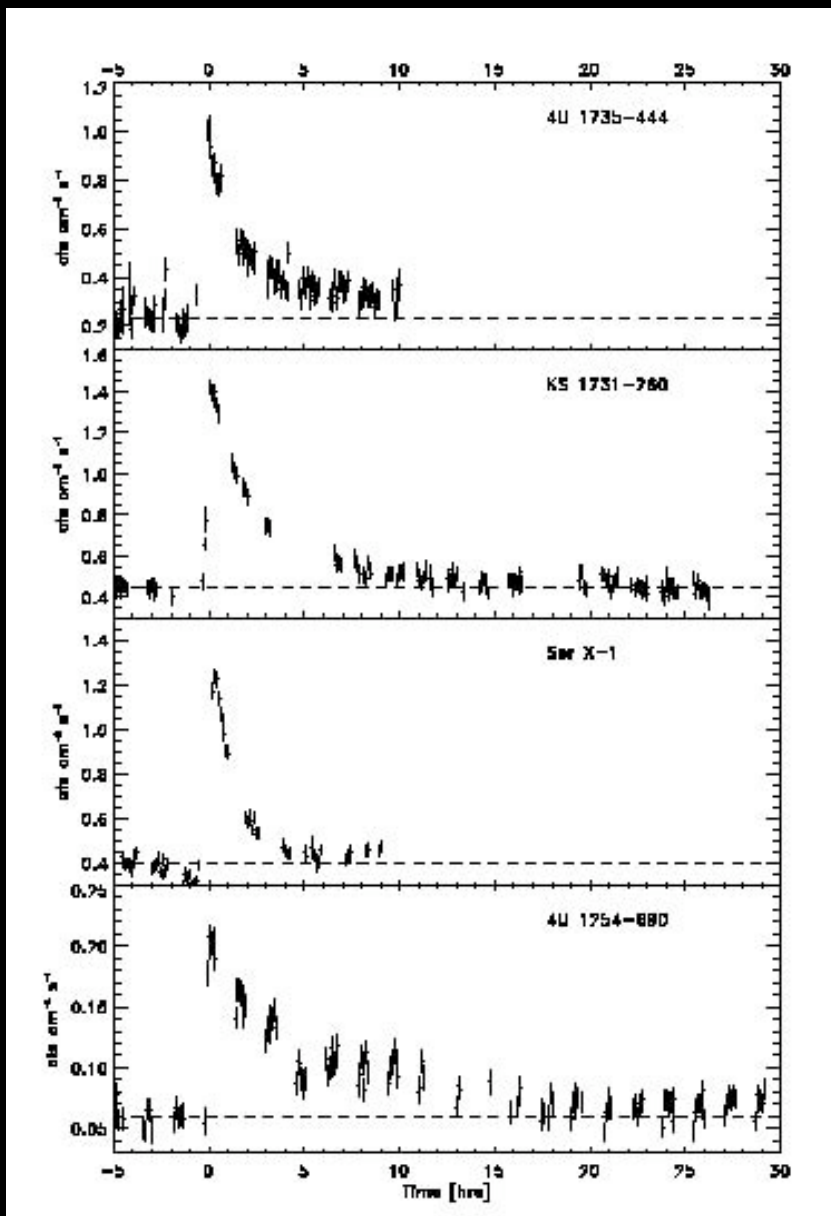


Eddington-limited burst

Cocchi et al. 2001

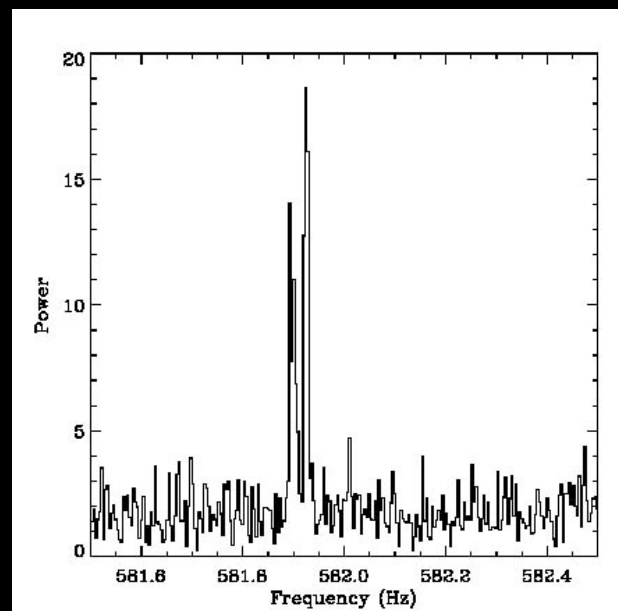
Superbursts

In't Zand et al. 2004



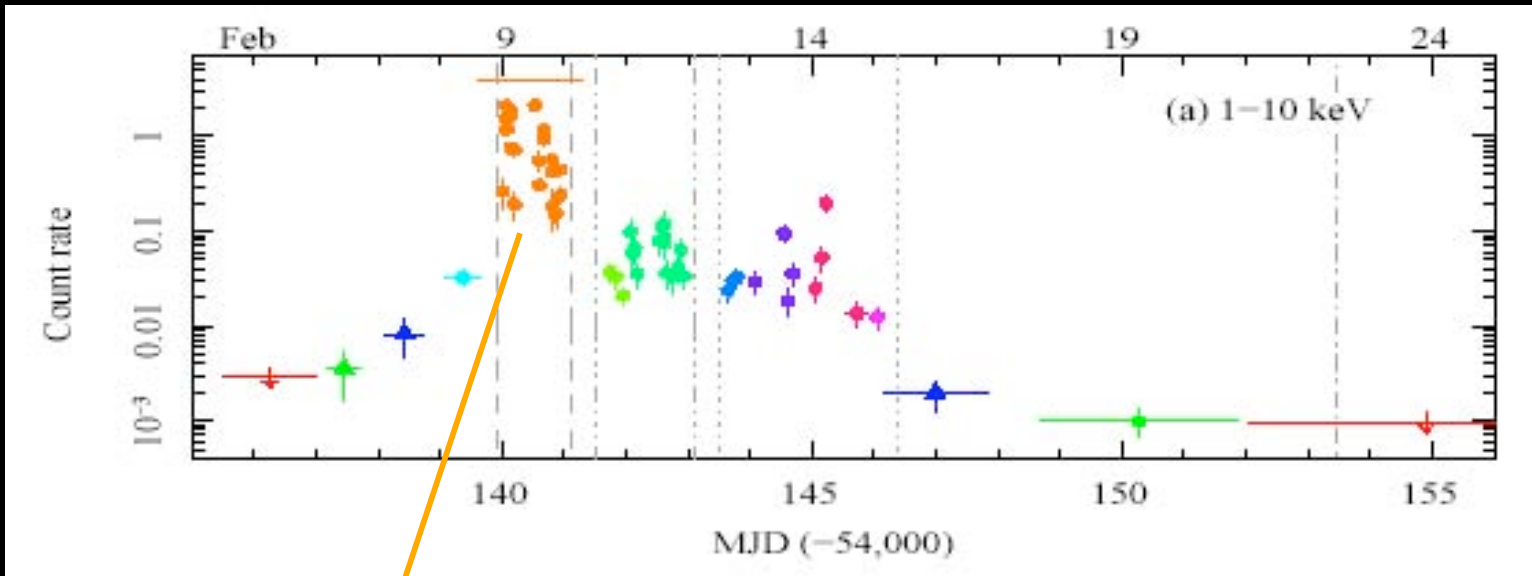
4U 1636-53

Strohmayer & Markwardt 2002

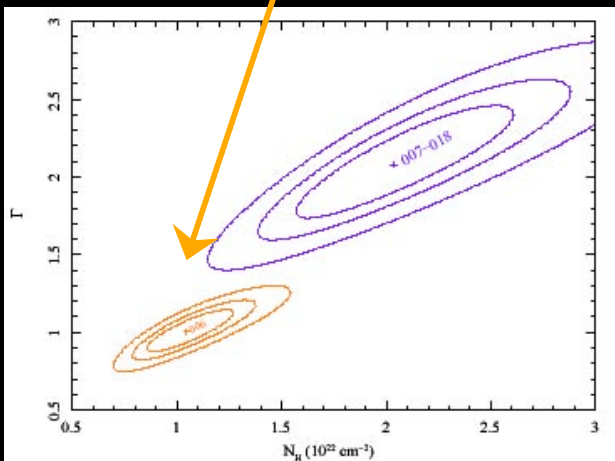


Fast transients

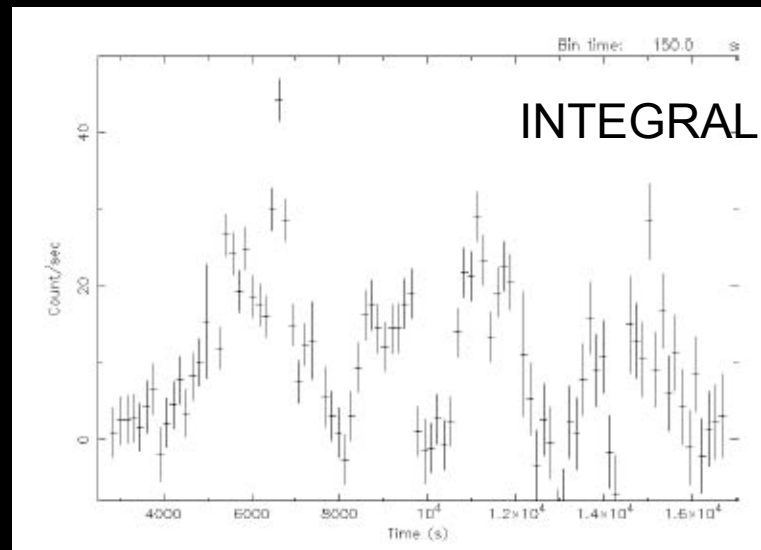
IGR J11215-5952



Romano et al. 2007
(see also poster)

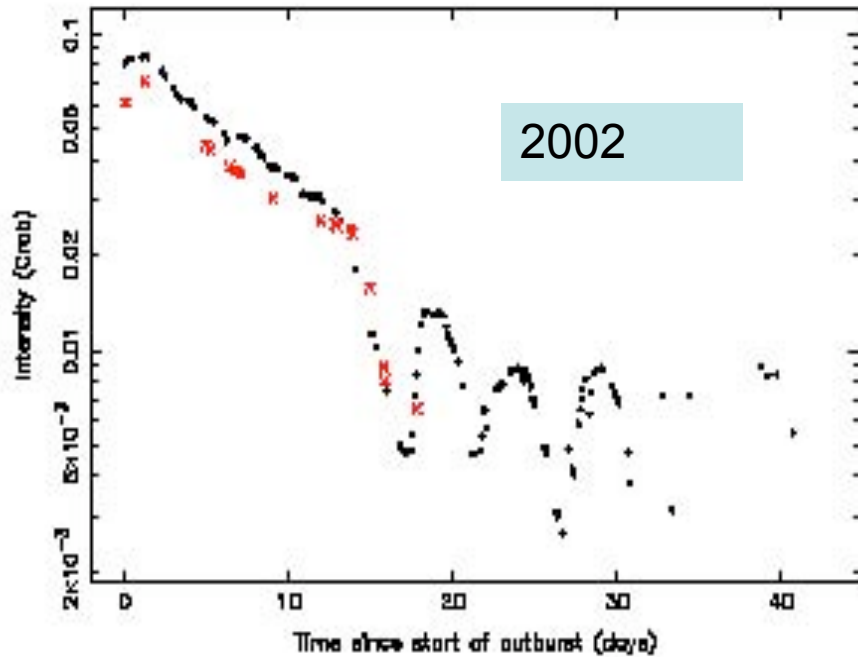


XTE J1739-302

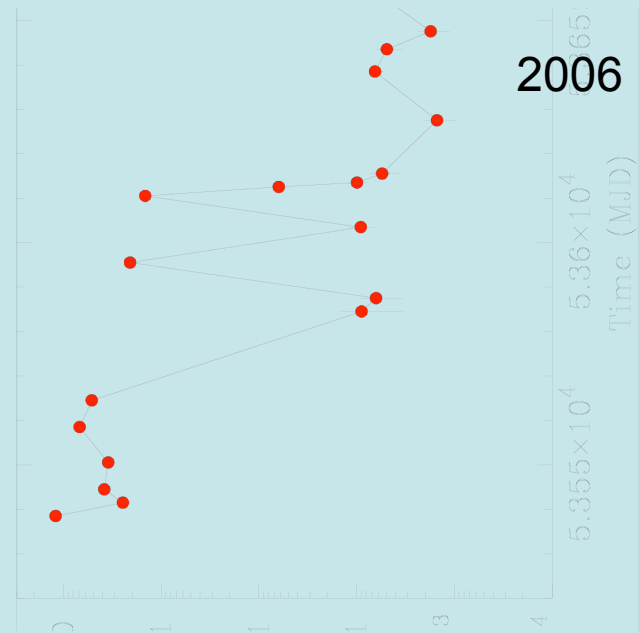


Sguera et al. 2006

X-ray transients



mCrab



Aql X-1

Campana et al. 1998

SAX J1808.4-3658

Campana et al. 2007a

Swift future: AXP/SGR

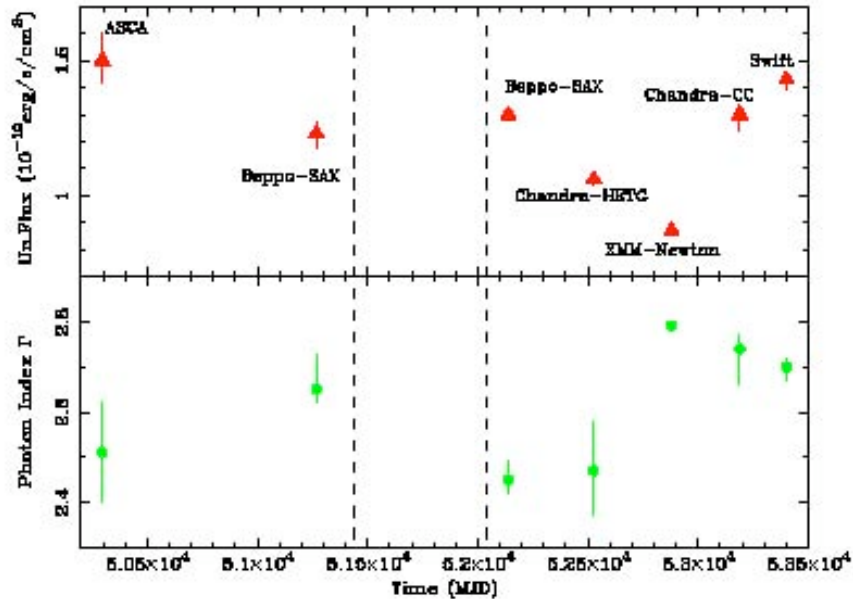
Follow long term flux and spectral changes

Detect bursts and/or follow them on a short time scale (repointing after any trigger from an AXP/SGR)

Follow the recovery after a glitch, either spectrally and temporally

AXP long term changes & simultaneous obs.

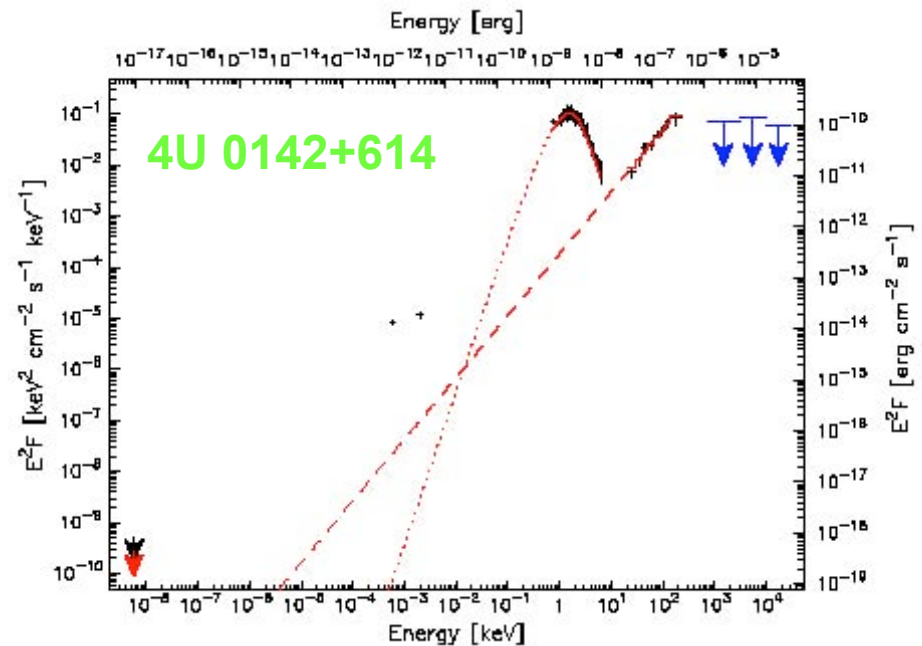
RXS J170849.0-400910



Den Hartog et al. 2007

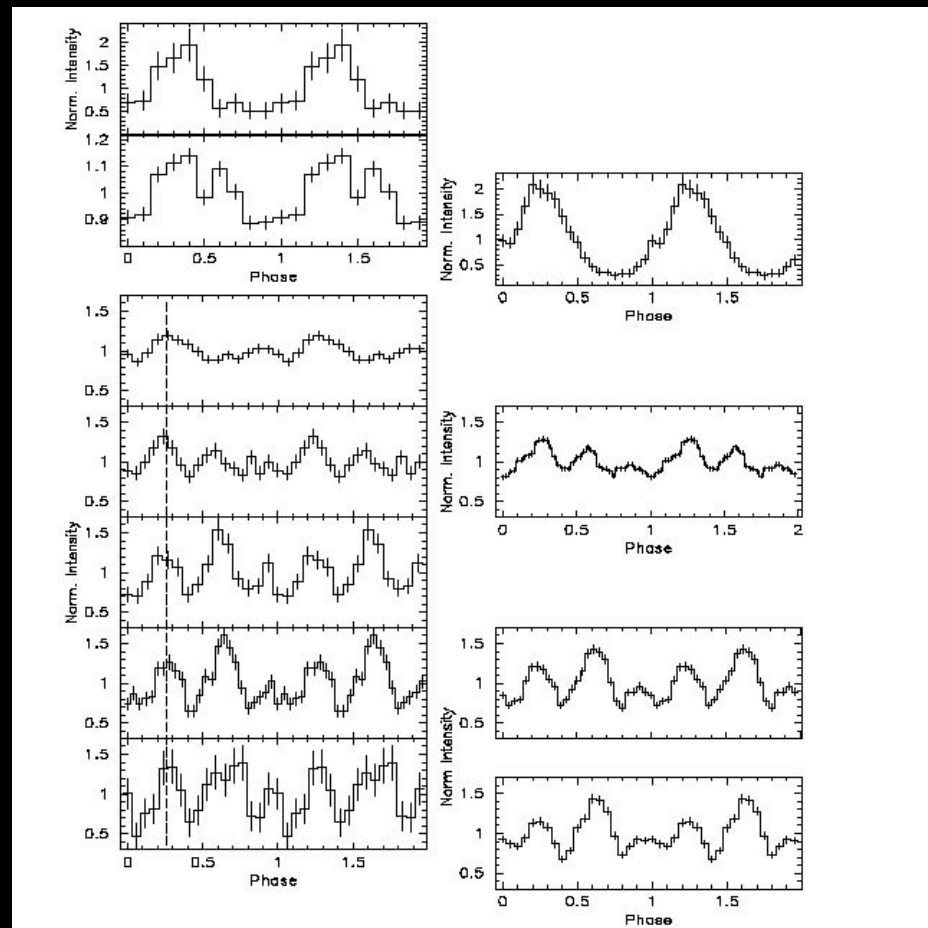
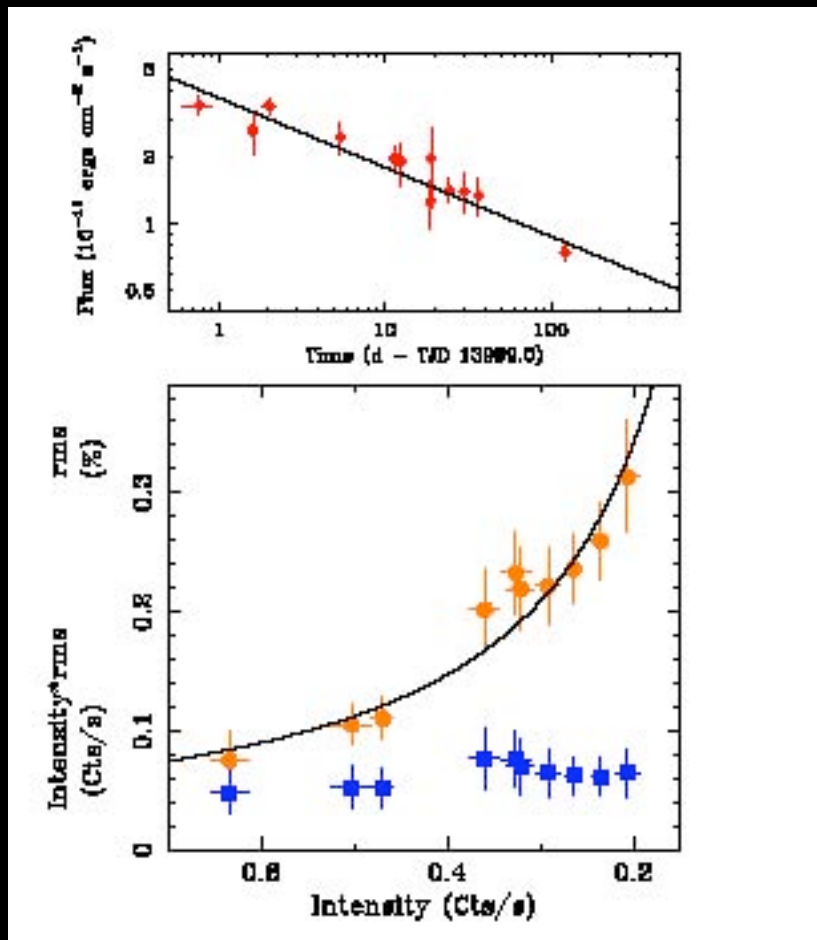
Campana et al. 2007b

Twisted magnetosphere scenario for AXPs



State College May 2007

Follow-up of AXP/SGR bursts



Israel et al. 2007b

CXO in Westerlund 1

Summary

Swift thanks to:

- **Wide energy range UV to hard X**
- **Flexibility**
- **Sensitivity (especially for binaries and AXP that are bright objects)**

Can in the next few years provide important results in this field

- **Detecting (new outbursts, bursts, superbursts, glitches)**
- **Monitoring (evolution of outbursts, long term spectral changes, timing)**
- **Archiving (long term light curves)**