

Benvenuti all'Astro-Siesta!!!!

Cosa intendo per Astro-Siesta?

- meetings settimanali
- informali
- per/con tutti i ricercatori (non solo studenti o i soliti ignoti...)
- con talks brevi (10-20 minuti)
- occhio all'audience!!

<http://www.iasf-milano.inaf.it/~ada/personal.html>

Quando

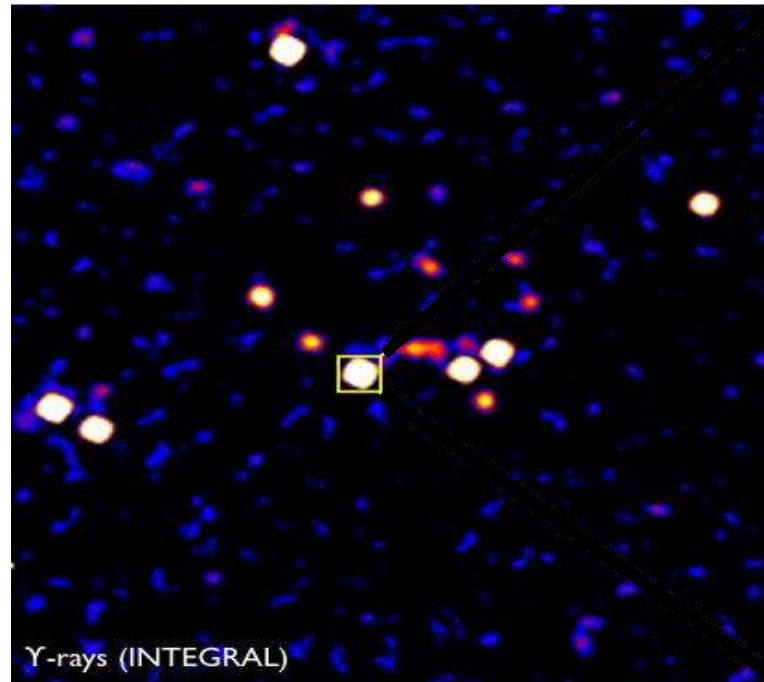
Chi

Cosa

<i>25 Gennaio 2007</i>	<i>Ada (Paizis)</i>	<i>Una nuova sorgente nel cielo: IGRJ17497-2821</i>
<i>1 Febbraio</i>	<i>Marco (Scodreggio)</i>	<i>Separare le galassie early e late-type nelle survey cosmologiche</i>
<i>8 Febbraio</i>	<i>Daniele (Mennella)</i>	<i>Test e calibrazione del modello di volo di Planck-LFI</i>
<i>15 Febbraio</i>	<i>Mariachiara (Rossetti)</i>	<i>Proprieta' termodinamiche di ammassi di galassie in interazione</i>
<i>22 Febbraio</i>	<i>Michela (Uslenghi)</i>	<i>TBD</i>

... to be continued (almeno spero)

A new source in the sky: IGR J17497-2821



September 17th 2006

Hunting the nature of IGR J17497-2821 with X-ray (Chandra) and NIR observations
Paizis et al., 2007 (Referee process, ApJL)

Che succede quando si scopre una nuova sorgente?

IGR J17497-2821: a new hard X-ray transient detected by INTEGRAL.

ATel #885; [Soldi S., Walter R., Eckert D., Balman S., Bazzano A., Beckmann V., Belloni T., Boggs S., Capitanio F., Chenevez J., Del Santo M., Diehl R., Donnarumma I., Goldoni P., Gotz D., Leyder J.-C., Merèghetti S., Paizis A., Pottschmidt K., Sidoli L., Tarana A., Tueller J., Watanabe K., Weidenspointner G.](#)

[on 18 Sep 2006; 13:49 UT](#)

Distributed as an Instant Email Notice (Transients)

Password Certification: Roland Walter (Roland.Walter@obs.unige.ch)

Subjects: X-ray, Gamma Ray, Transients

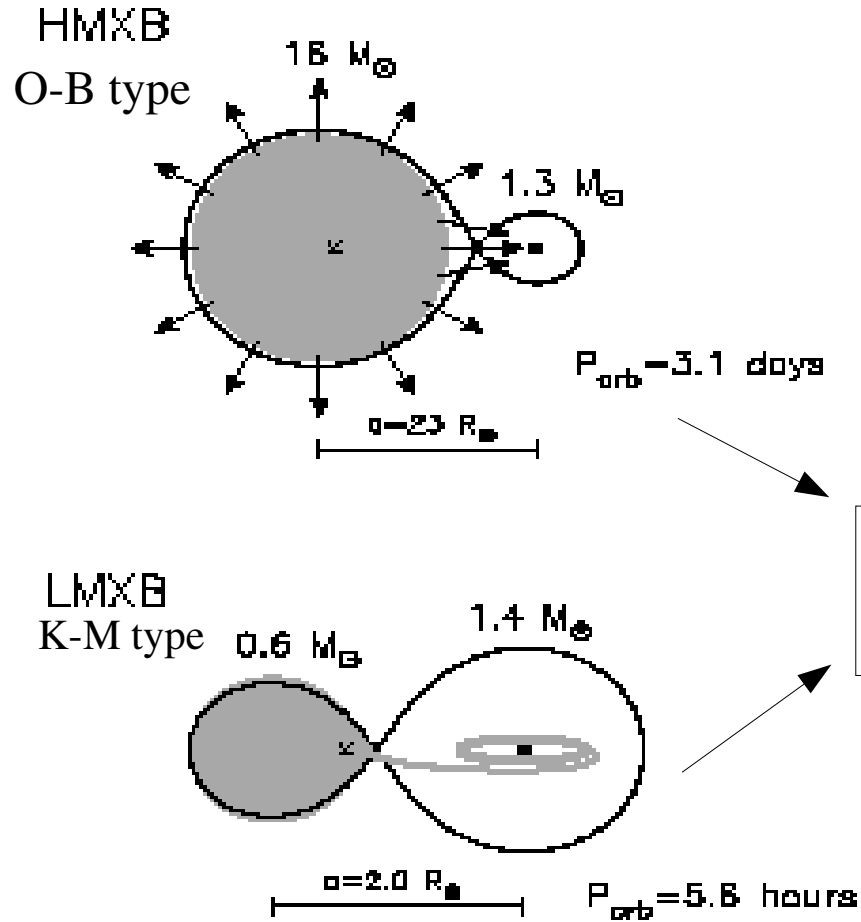
Referred to by ATel #: [886](#), [888](#), [889](#), [890](#), [891](#), [897](#), [900](#), [906](#), [907](#), [909](#), [914](#), [936](#)

During the INTEGRAL Key Programme observations of the Galactic Centre region, the IBIS/ISGRI telescope detected the new hard X-ray transient IGR J17497-2821 at the position $ra = 267.4277$, $dec = -28.3443$. The source brightened above 25 mCrab (20-40 keV flux averaged over ~40 minutes) starting from 2006-09-17T00:35 (UTC), reaching 40 mCrab at the end of the revolution (2006-09-18T14:54). The source varies on time scales of less than one hour and is also detected above 40 keV. INTEGRAL will continue to monitor this region for the next week.

Best candidate for such transient events: X-Ray Binaries

X-RAY BINARIES

Persistent/Transient



different spectra!
different lightcurves!

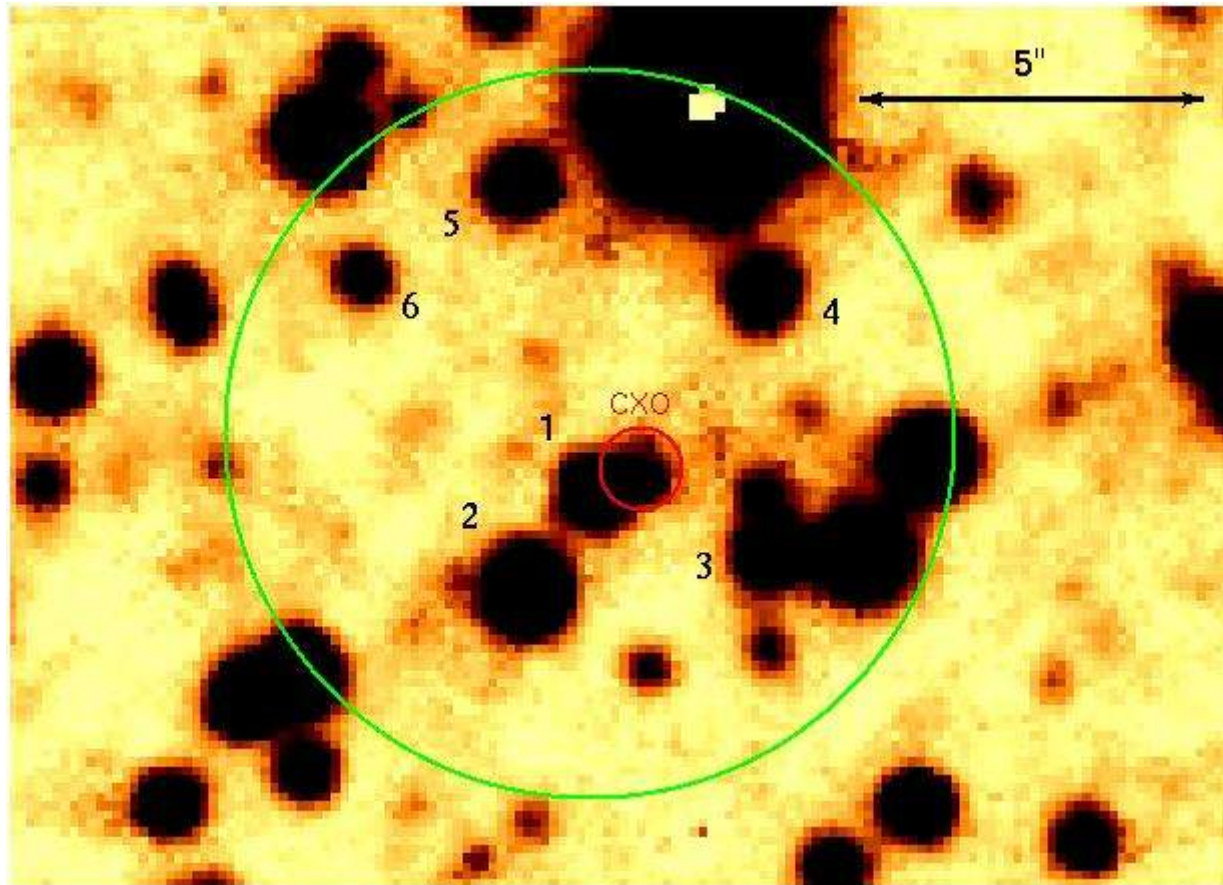
Nature of companion and of compact object needed \rightarrow multi-wavelength \rightarrow correct-position!

LOCATION ACCURACY

INTEGRAL/IBIS: 90% confidence error of 1' (Shaw et al., 2006)

Swift/XRT: 90% confidence error of 5" (Kennea et al., 2006)

Chandra: 90% confidence error of 0.6" (Paizis et al., 2006)



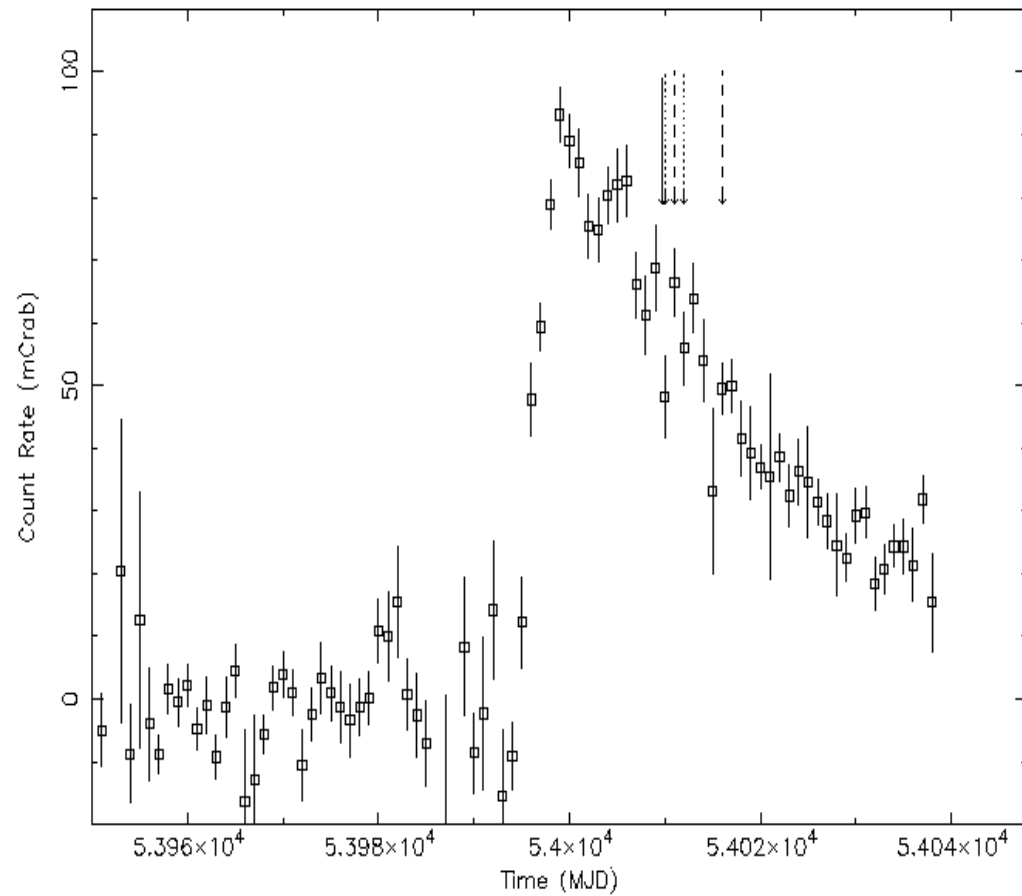
Ks band

OK, ready now

- LMXB or HMXB?
- Black Hole (BH) or Neutron Star (NS)?

X-RAY LIGHT CURVE

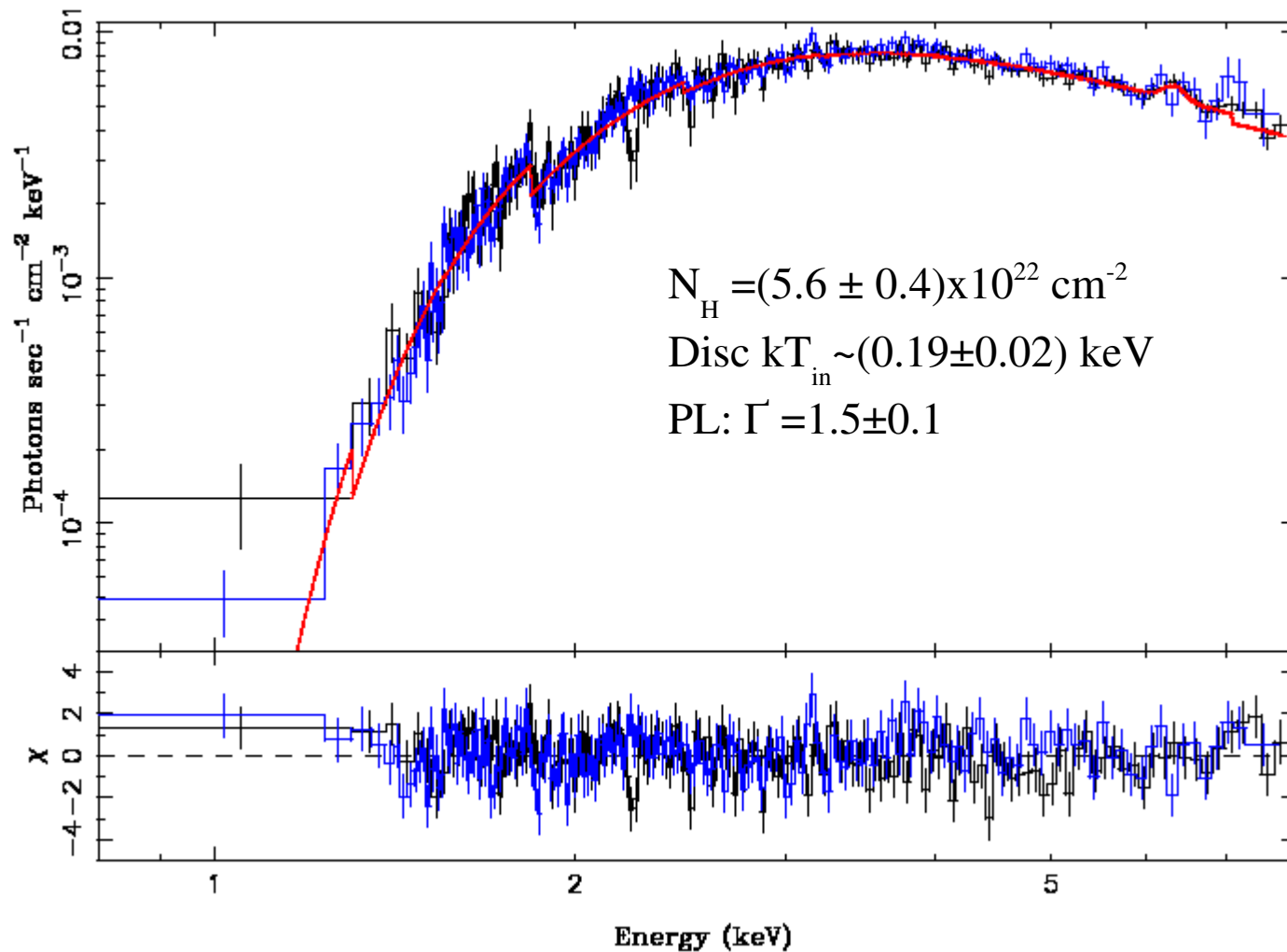
Swift/BAT (15-50 keV)



1mCrab = 1.6880E-11 ergs /cm² sec

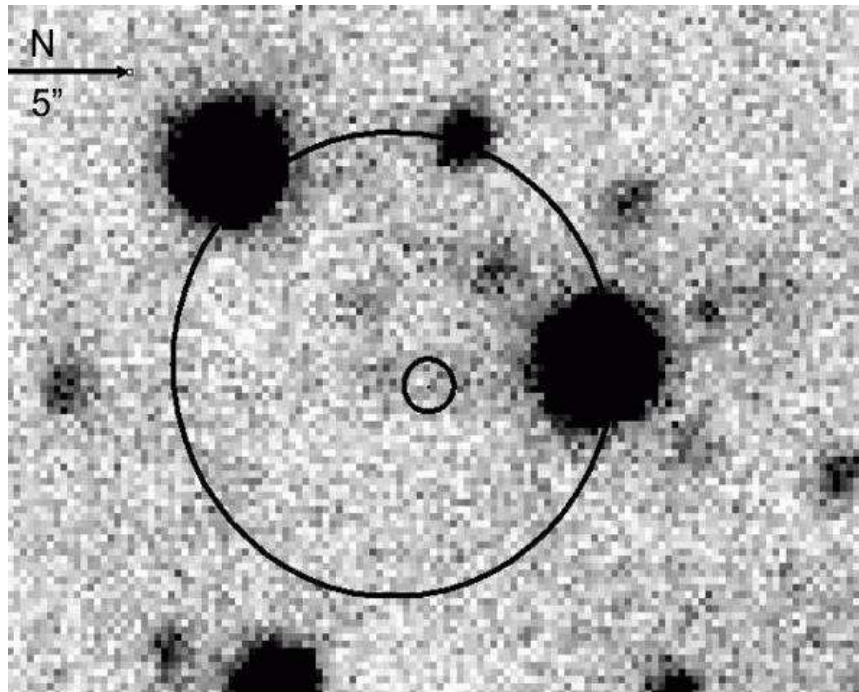
- FRED X-ray lightcurve: looks like a LMXB

X-RAY SPECTRUM

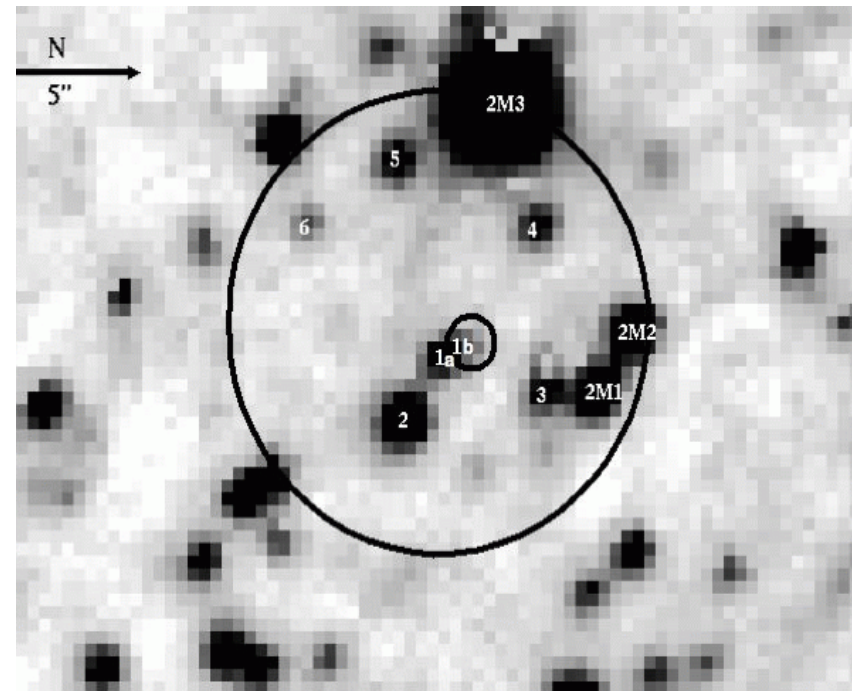


- Disc plus 1.5 slope power-law: REALLY looks like a LMXB!
- Source at Galactic Centre distance
- At 8 kpc the source 1-20 keV 10^{37} erg/sec (typical of XRB in outburst)

X-rays suggest LMXB. What does Optical/NIR say?



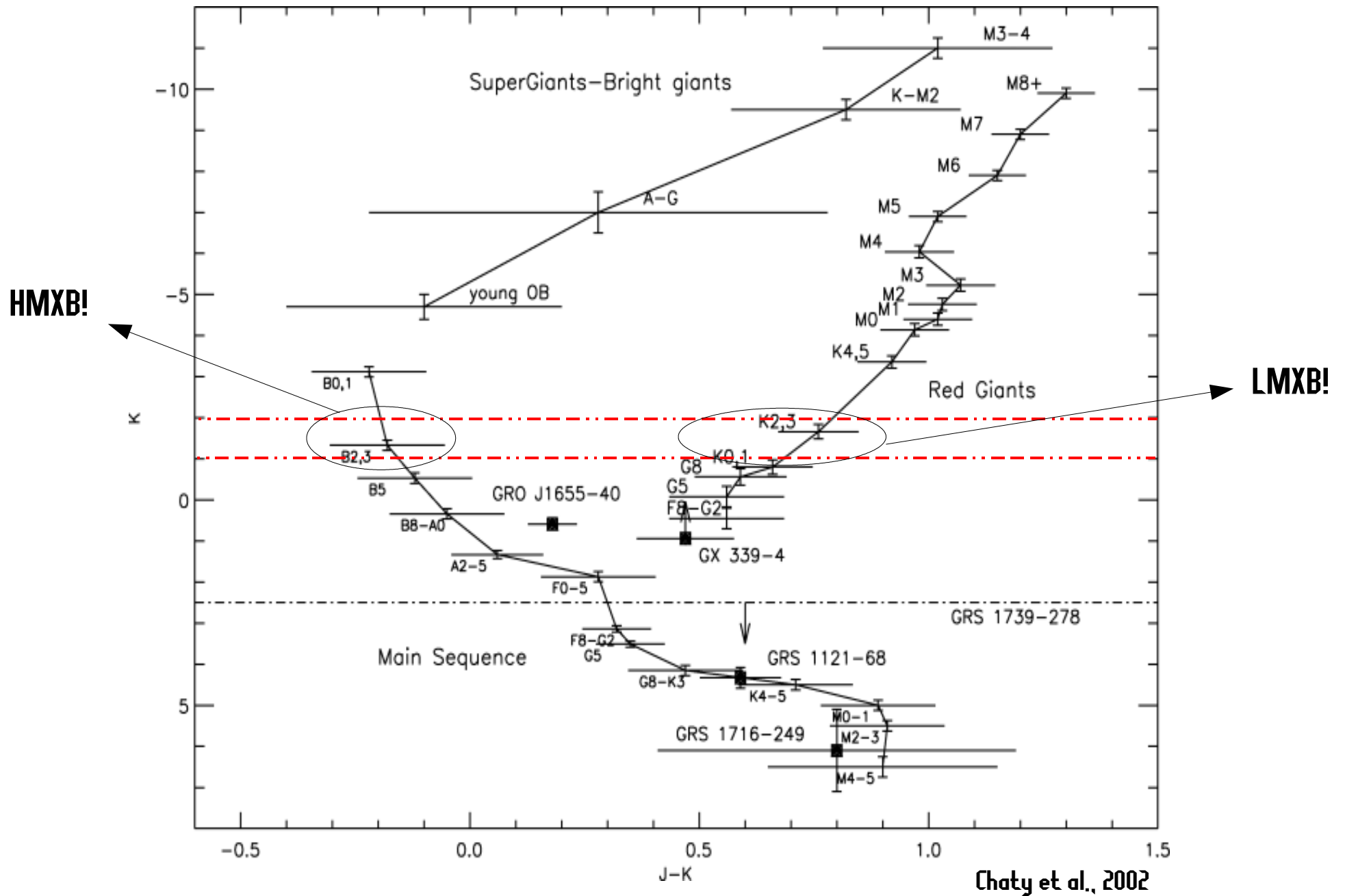
Z-band (optical)



K band (NIR)

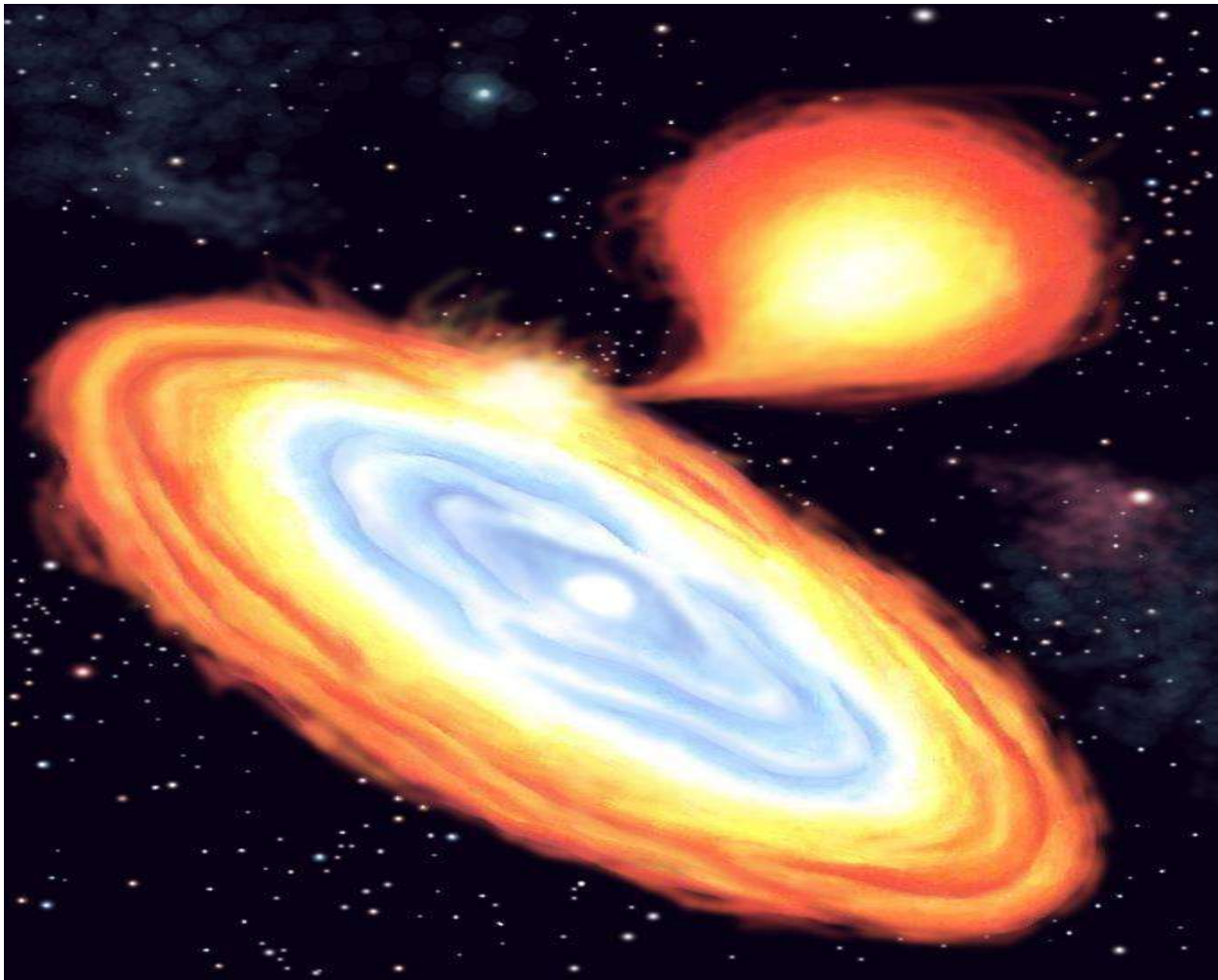
$$\text{mag}_K = 16.1 \pm 0.3$$

$$N_H \longrightarrow A_V \longrightarrow A_K \xrightarrow[\text{mag}_K = 16.1 \pm 0.3]{@ 8 \text{ kpc}} -1.1 > M_K > -2/2$$



So, up to now:

1. X-ray light-curve suggests a LMXB (*INTEGRAL*, *Swift*);
2. X-ray spectrum suggests a LMXB (disc visible in *Chandra*);
3. NIR magnitude *allows* for LMXB (red giant K-type companion)



What about the compact object? BH or NS?

BH or NS?

- Spectrum
 - our *Chandra* spectrum cannot tell, could be either BH or NS;
 - SUZAKU detected the source up to ~ 300 keV, typical of a BH.
- Timing (*RXTE*):
 - no signal above 50 Hz, typical of BHs (not stringent though);
 - no pulsations or type-I X-ray bursts that would make it a NS
(bursts \neq outburst!)

Summary

- X-ray Binaries are binaries with a compact object i.e. emit in X-rays
- there are LMXB and HMXB
- they differ for accretion mechanism therefore # SPE and # LCR
- unless clear cases (pulsations, type one X-ray bursts...) it is difficult to assess the nature of the compact object (BH / NS)
- *IGR J17497-2821, recently discovered by INTEGRAL, is most likely a LMXB, hosting a BH*