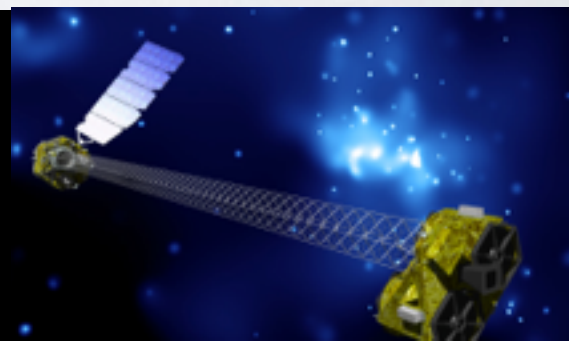


Piergiorgio Casella
(INAF OA-Roma)

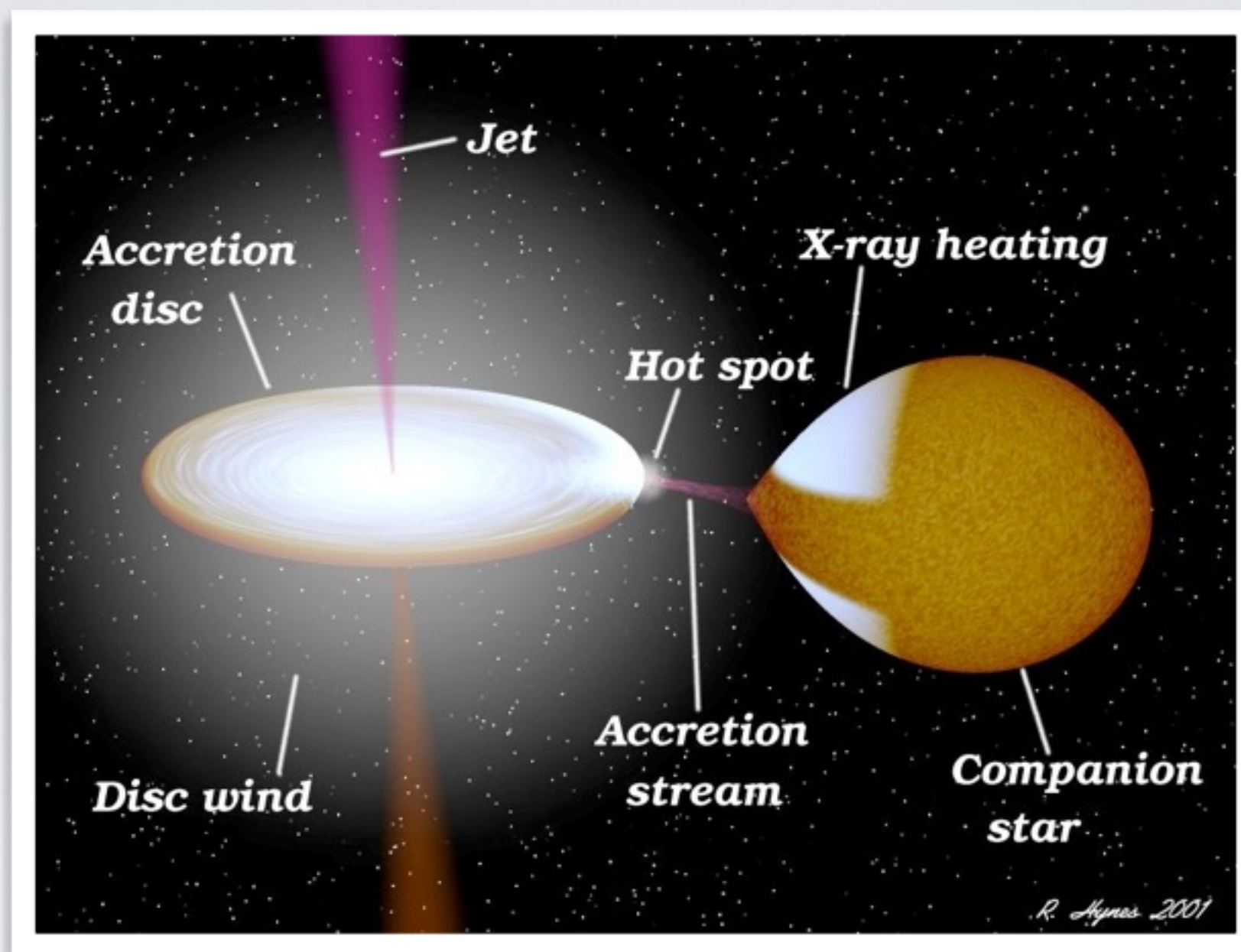
plan of the talk

- keep it short and simple
 - introduce LMXBs
 - what THESEUS can do
 - *introduce SMARTNet*

Low-Mass X-ray Binaries with THESEUS



Low-Mass X-ray Binaries: Multi-Wavelength Sources



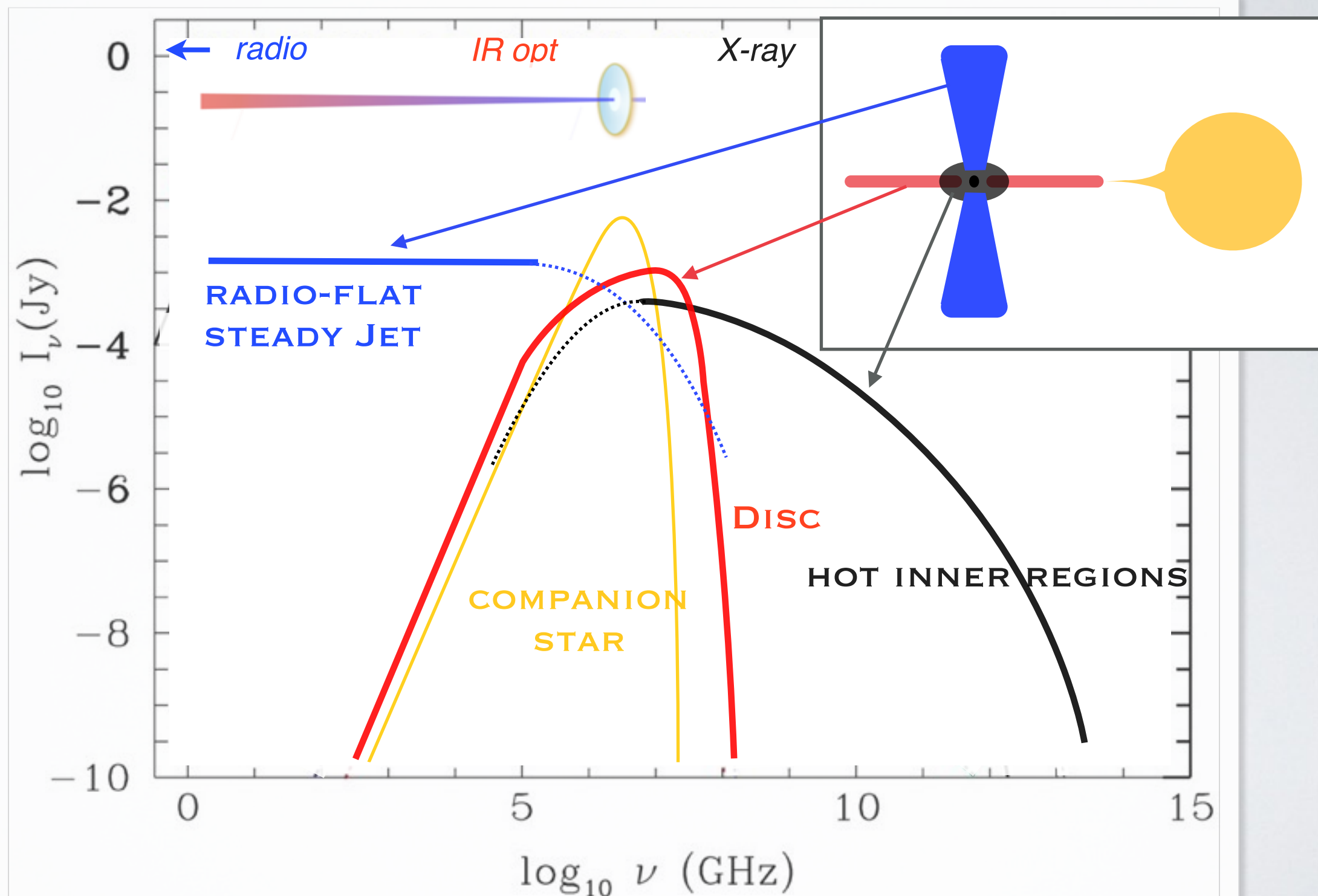
STUDY ACCRETION EVOLUTION ON PHD-TIMESCALES

COMPARISON WITH AGN / TDE

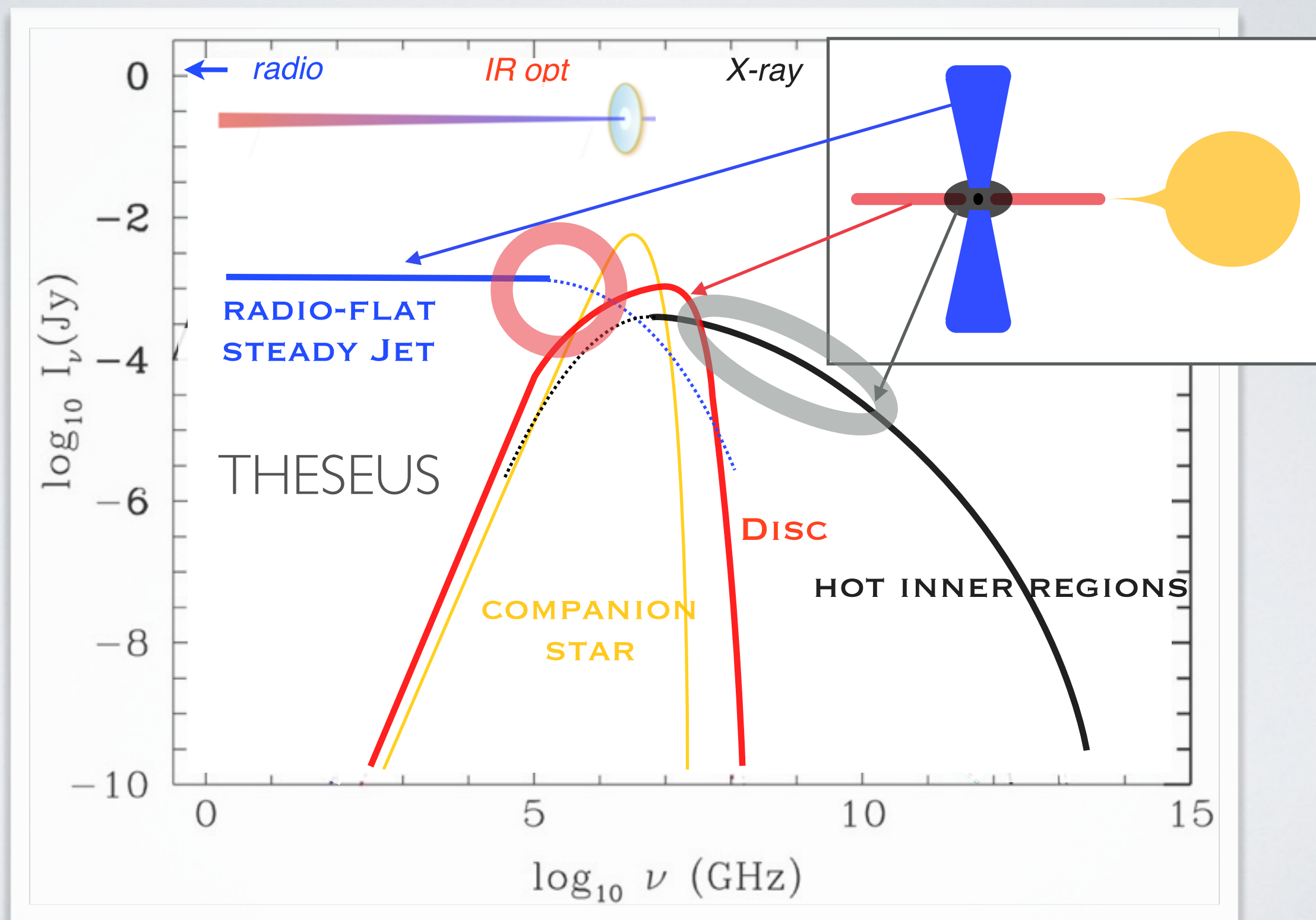
FEEDBACK ON ENVIRONMENT - STRONG GRAVITY



Low-Mass X-ray Binaries: Multi-Wavelength Sources

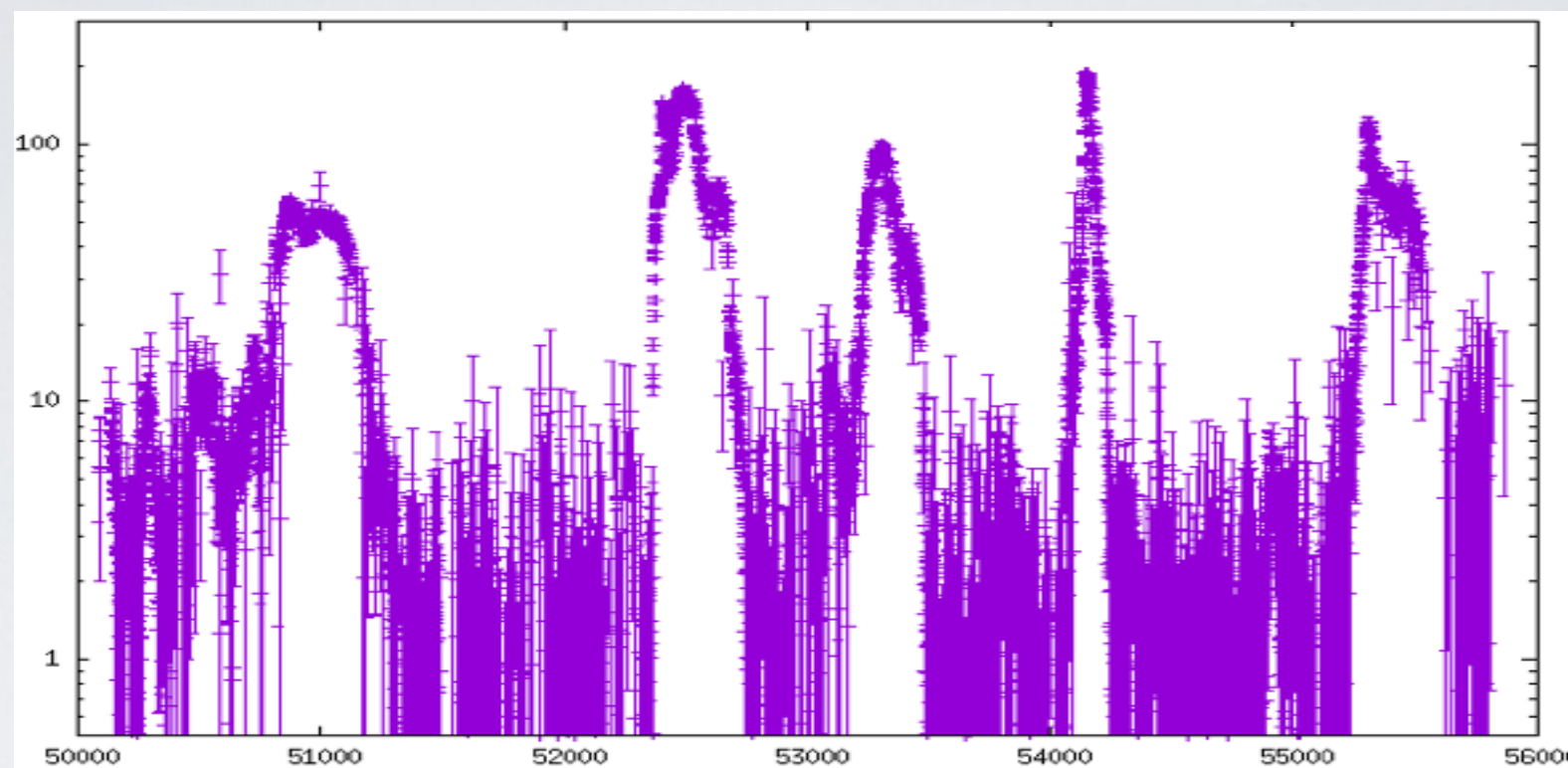


Low-Mass X-ray Binaries: Multi-Wavelength Sources



Low-Mass X-ray Binaries: Transient Sources

GX 339-4
RXTE/ASM
2-10keV



————— 16 years —————

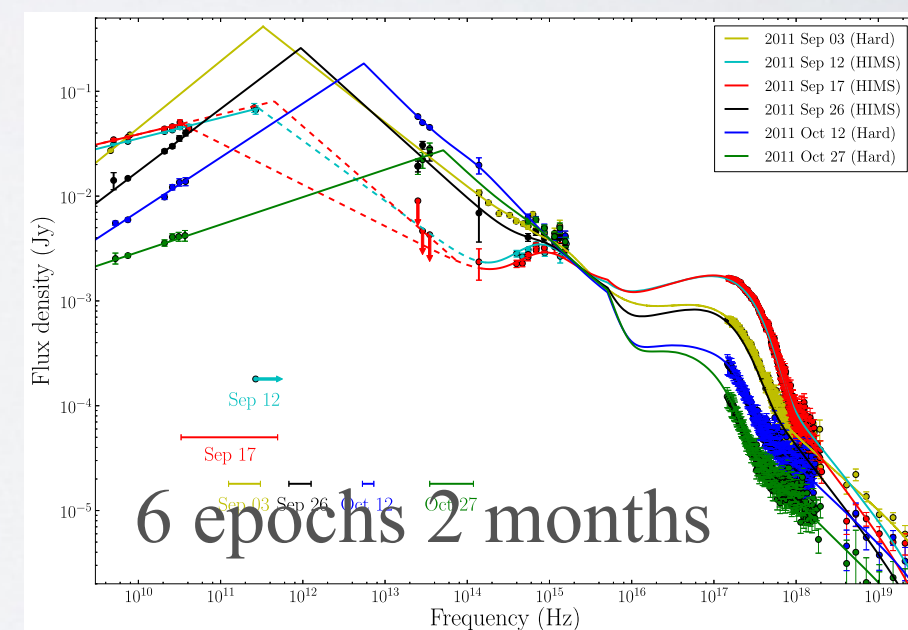
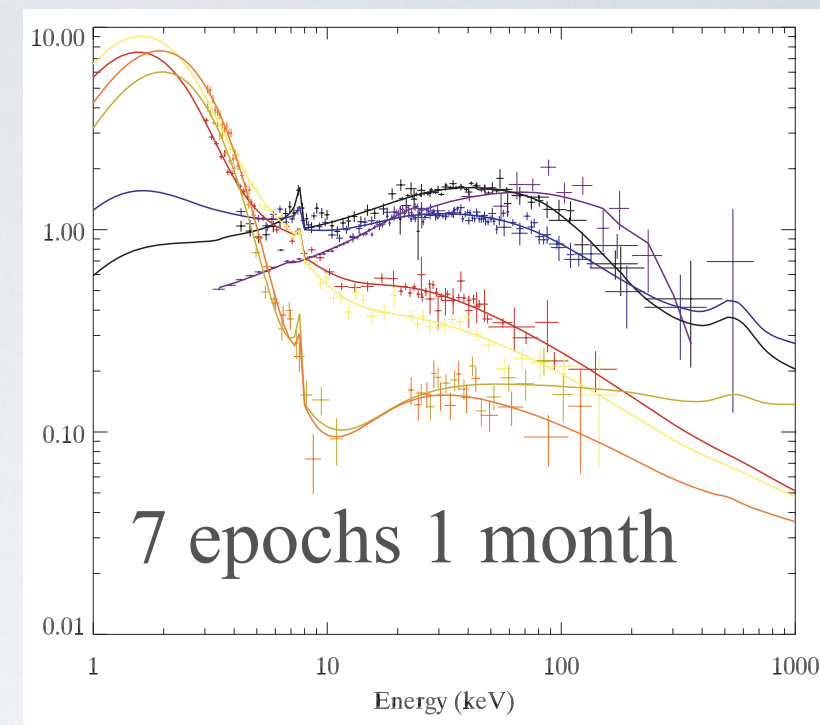
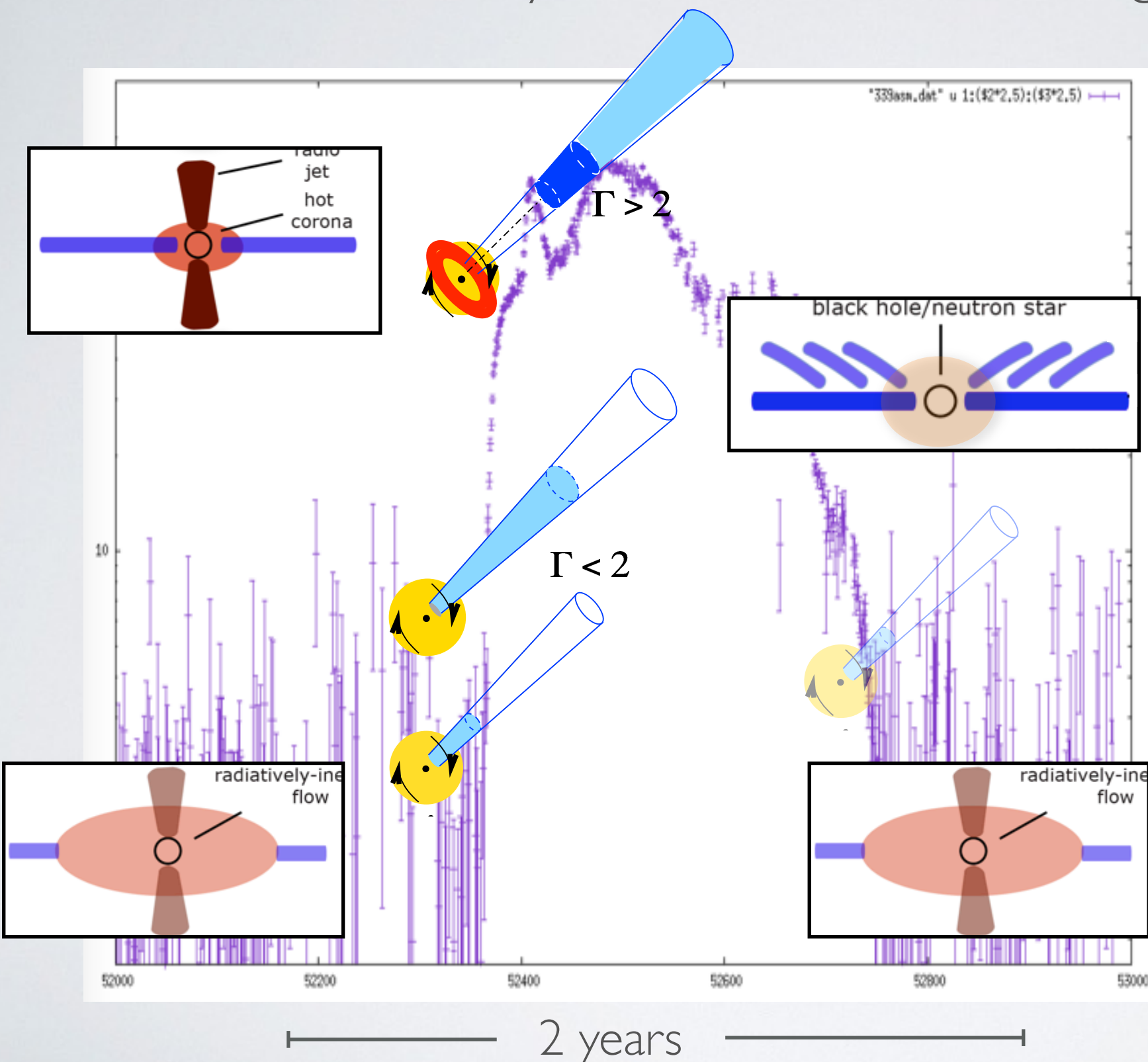
outburst rate: ranging from $\sim 1/\text{year}$ to $\sim 1/\text{century}$

outbursts duration: ranging from $\sim \text{few weeks}$ to ...persistent

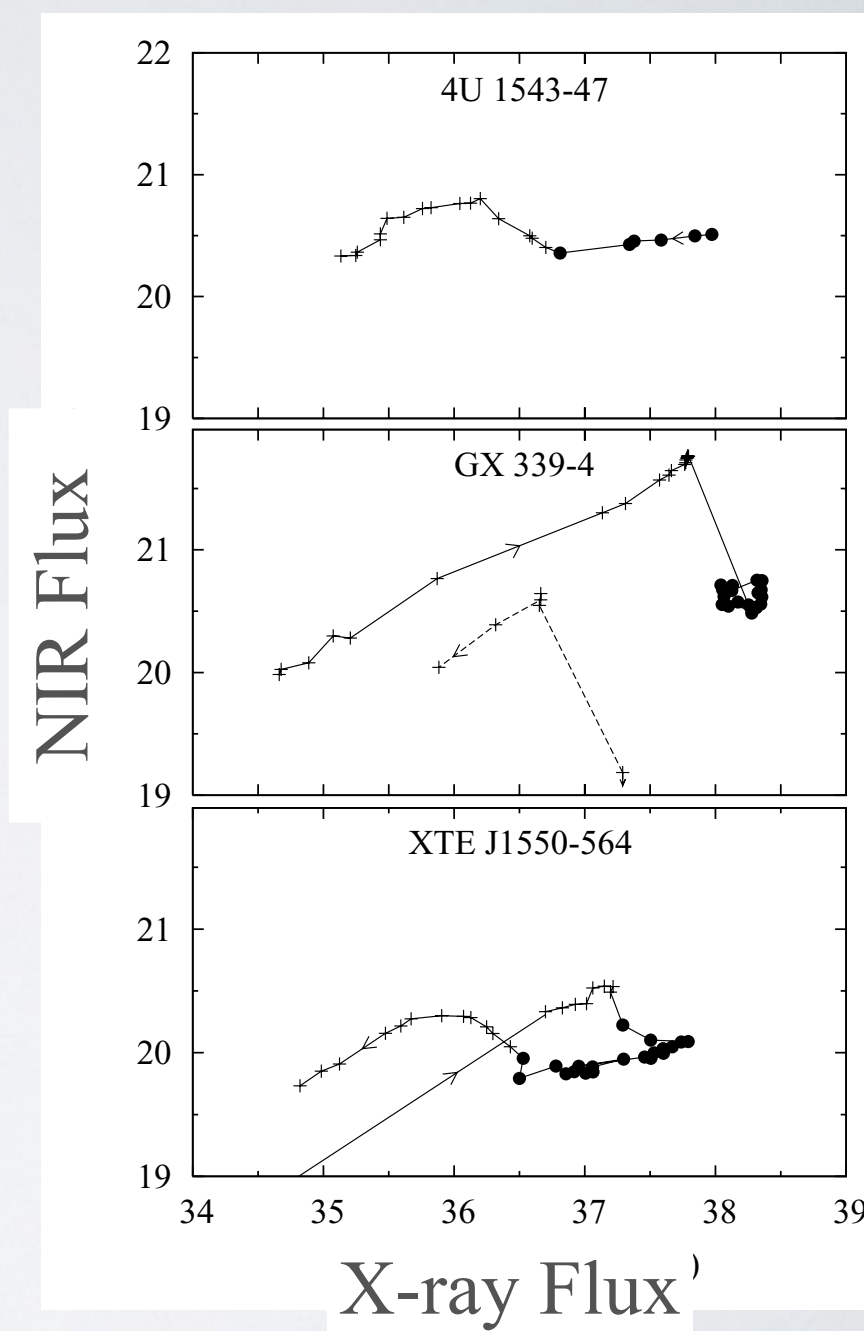
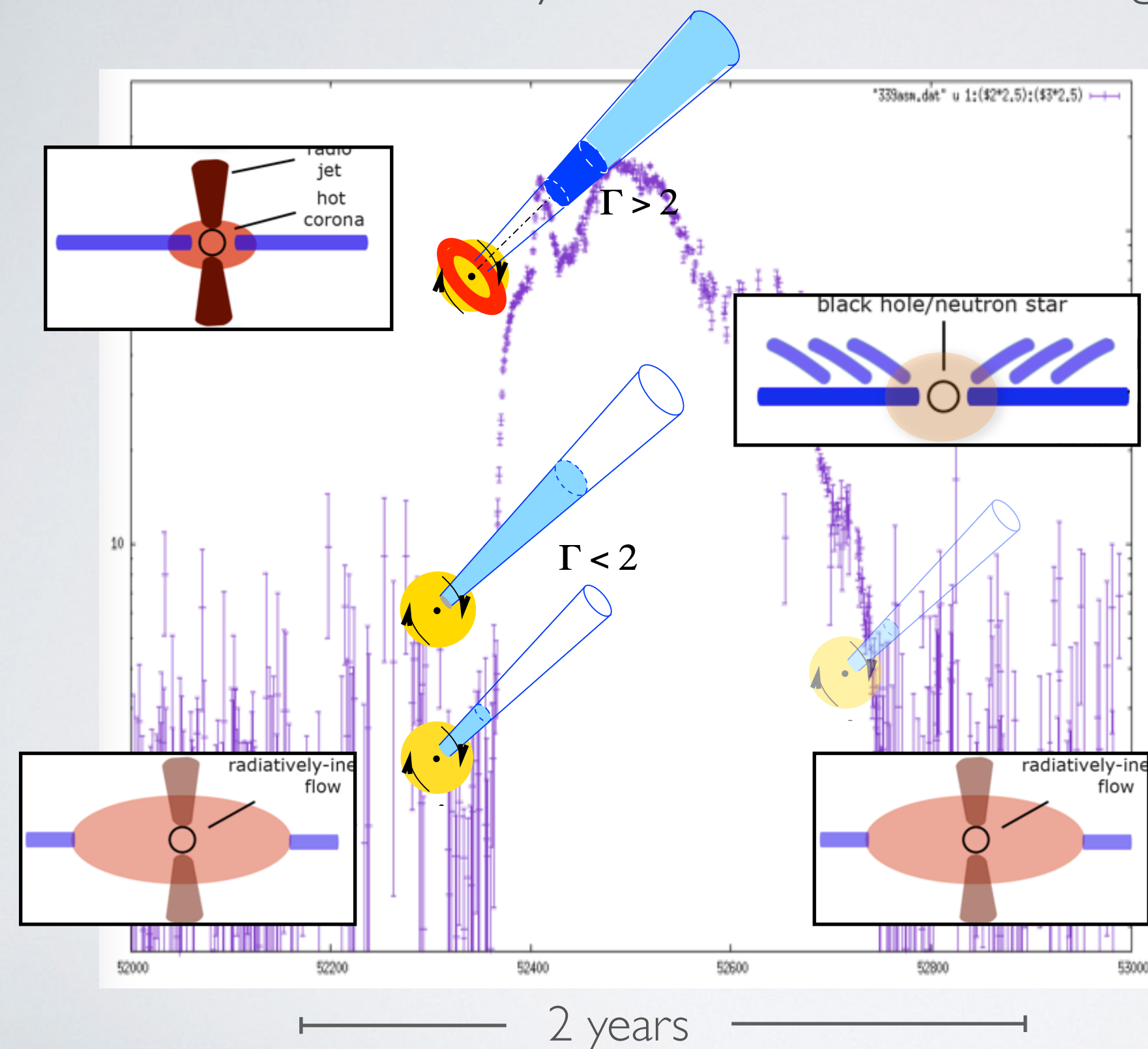
a few hundreds sources (~ 60 BH candidates + ~ 200 NS)



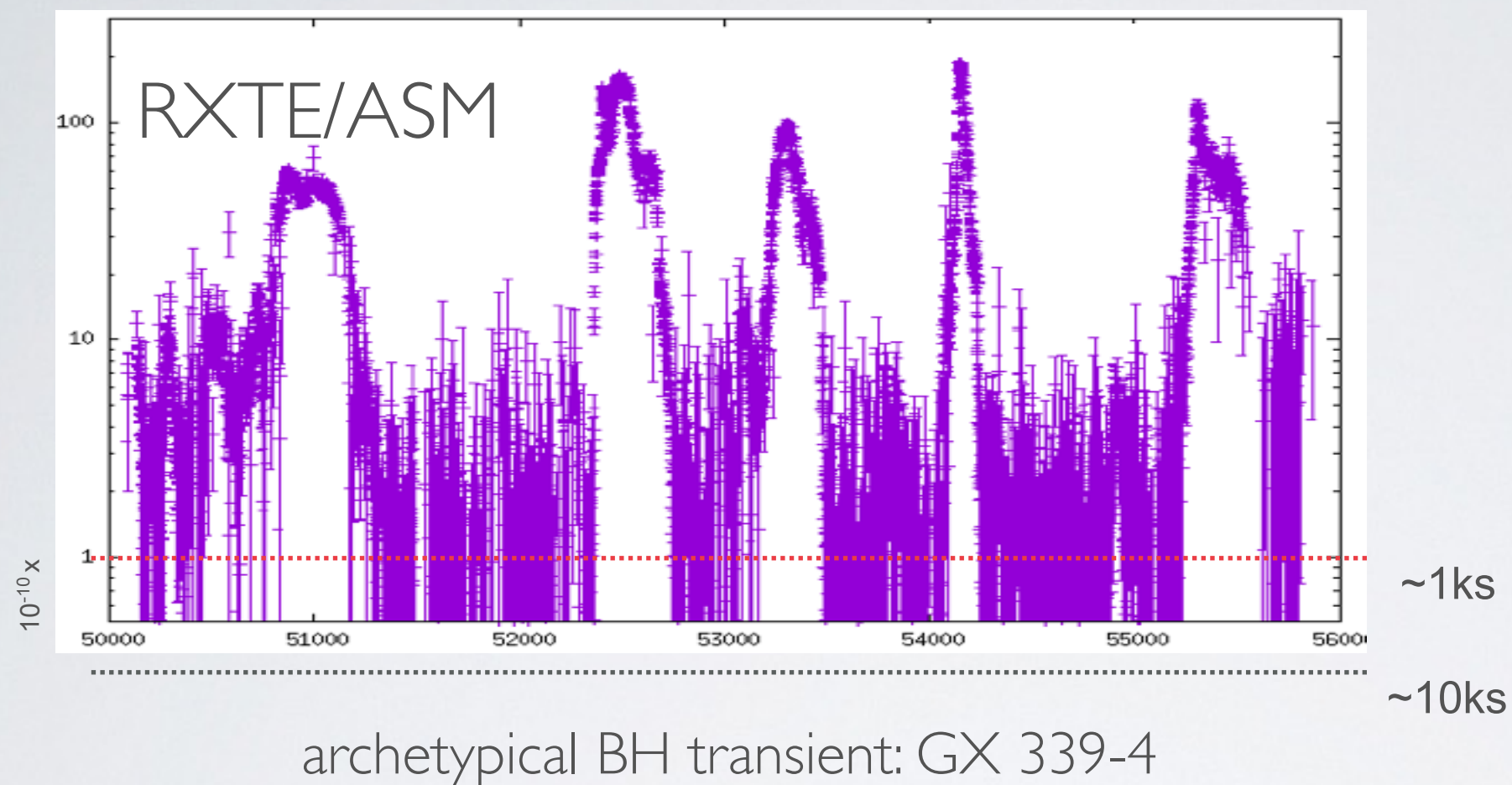
Low-Mass X-ray Binaries: Multi-Wavelength Variable Sources



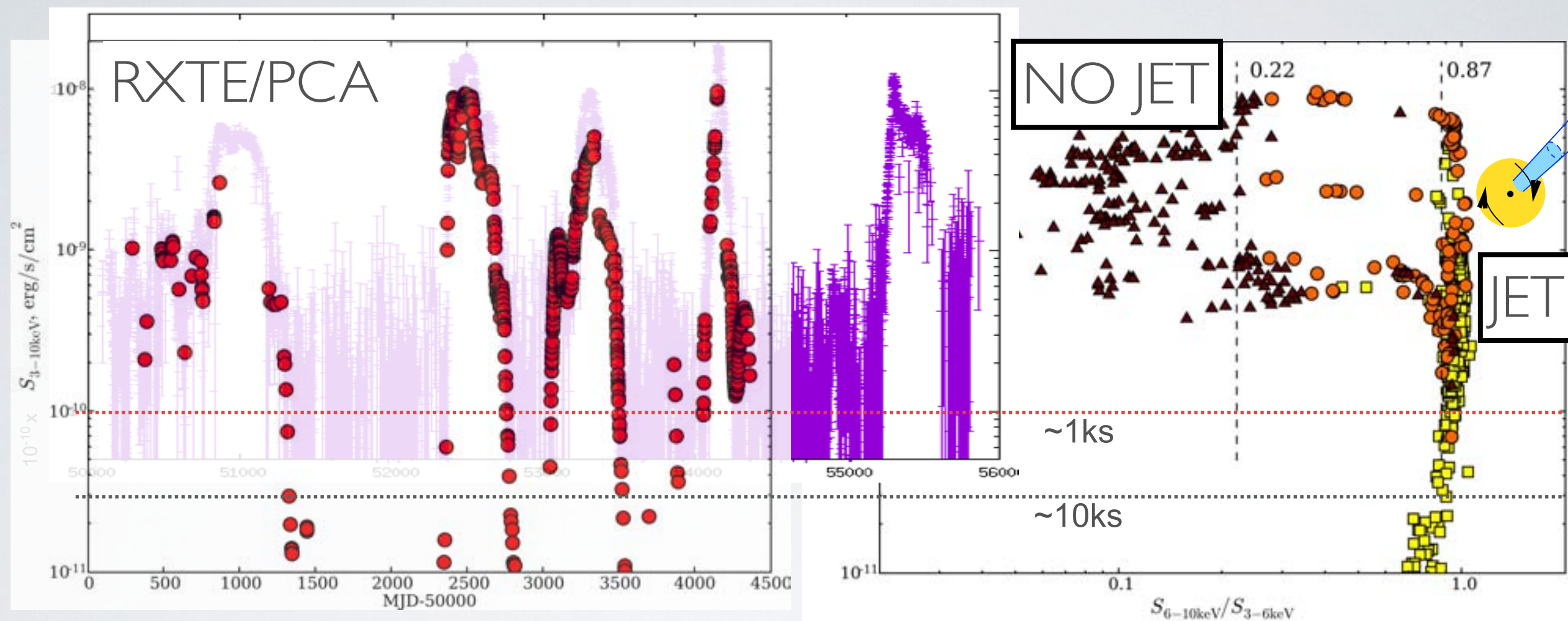
Low-Mass X-ray Binaries: Multi-Wavelength Variable Sources



Low-Mass X-ray Binaries: seen by THESEUS



Low-Mass X-ray Binaries: seen by **THESEUS**



in several cases, IR flux always accessible with IRT...DOWN TO QUIESCENCE

THESEUS can cover the **WHOLE** outburst
in both X-rays and IR



Low-Mass X-ray Binaries: seen by **THESEUS**

Key question I: **WHERE** are there?

- **Triggers** needed, for large-facility follow ups

Crucial point for XB community

we NEED to know when a XB goes on

we NEED to know what the source is doing,
to trigger campaigns



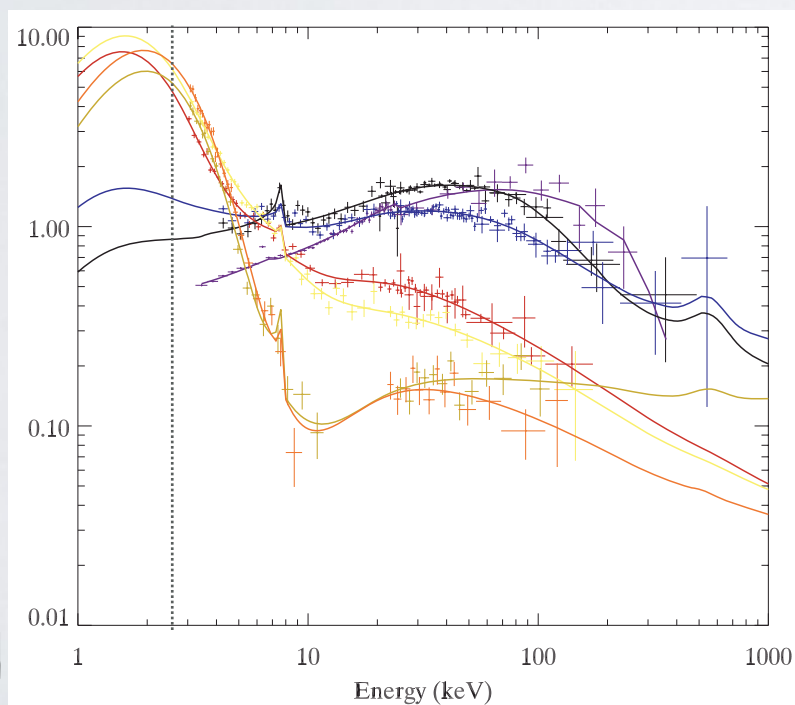
Low-Mass X-ray Binaries: seen by **THESEUS**

Key question 1: **WHERE** are there?

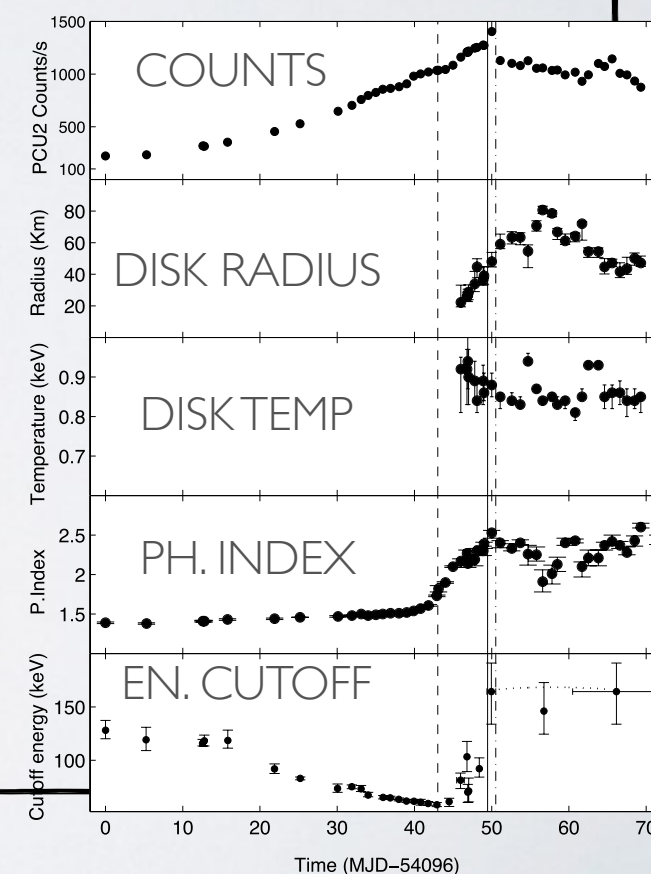
- **Triggers** needed, for large-facility follow ups

Key question 2: energy budget of accretion components

- X-ray sensitivities: **XGIS** can track the hot inflow evolution
- X-ray sensitivities: **SXI** can track the soft disc evolution



THESEUS will do it
for **all** (brights) **sources**
over the full
useful energy band



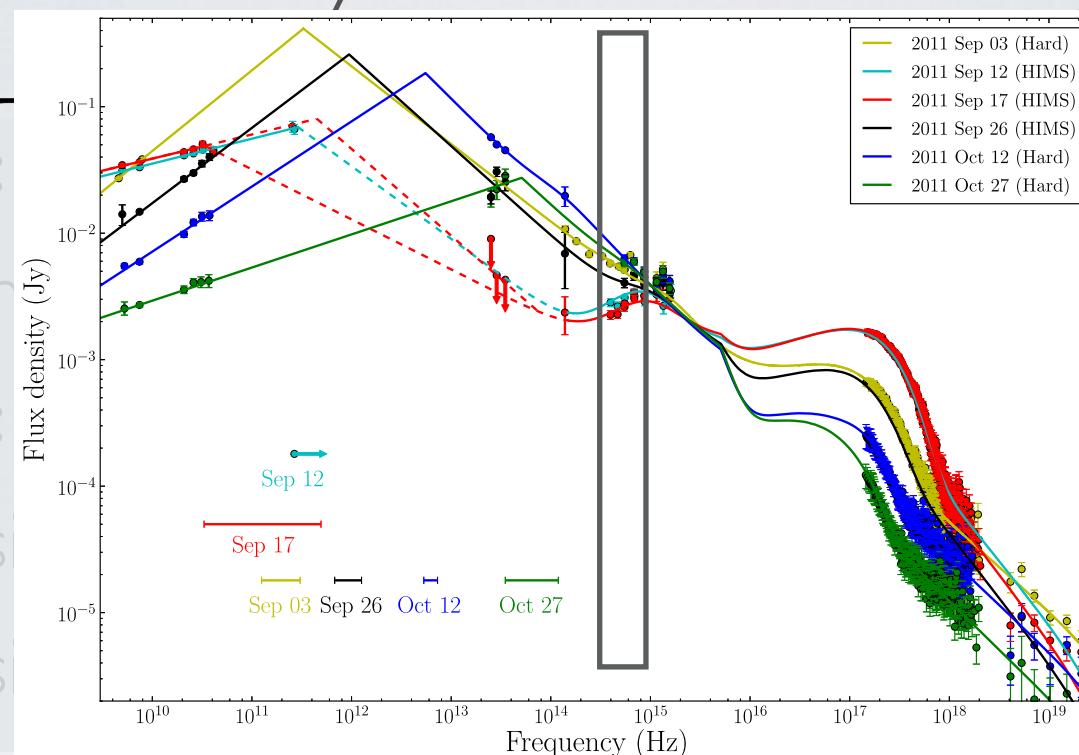
Low-Mass X-ray Binaries: seen by THESEUS

Key question 1:

- Triggers

Key question 2:

- X-ray sens
- X-ray sens



nponents

ow evolution

evolution

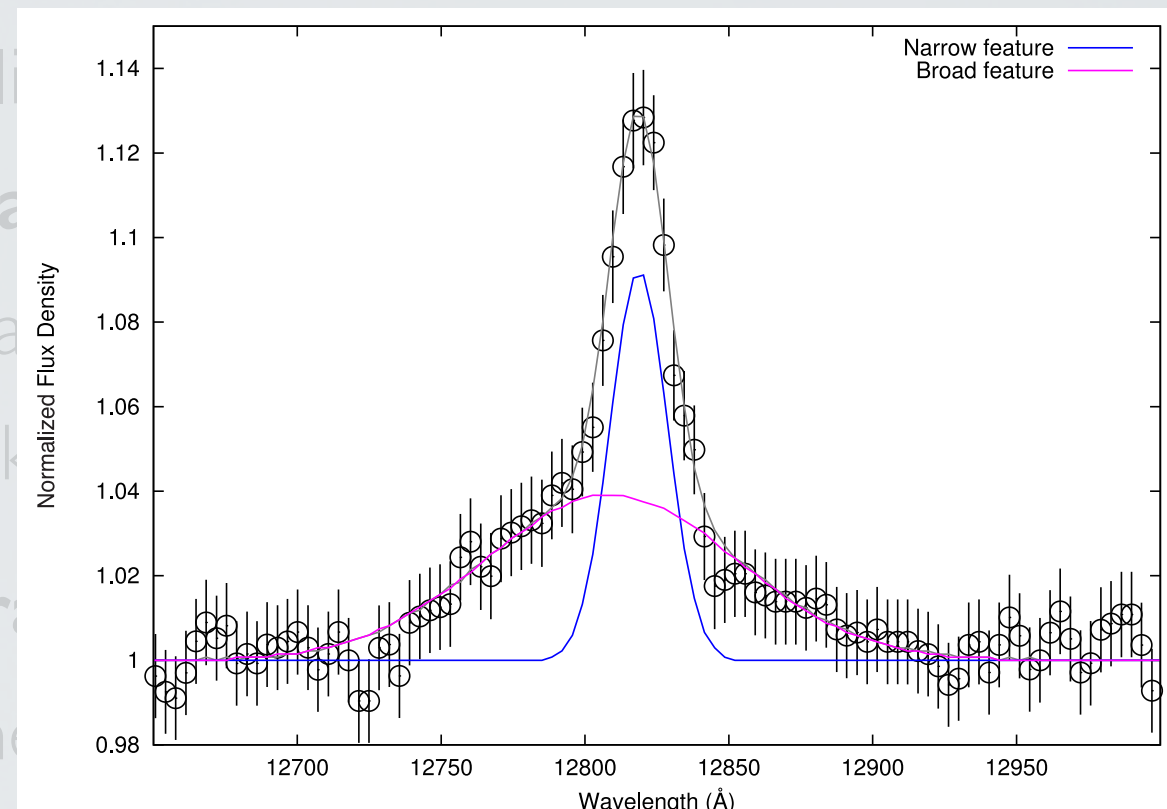
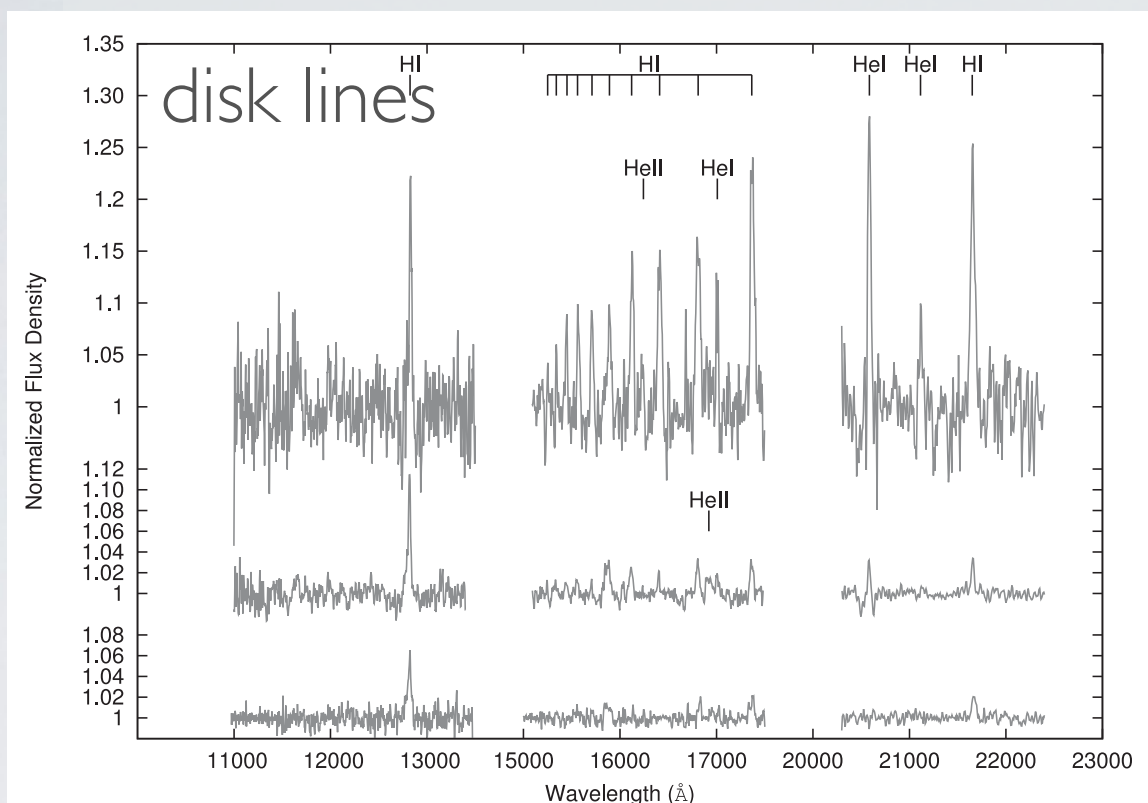
Key question 3: jet launching, jet radiative properties

- IR-sensitivities: **IRT** can track the jet spectral evolution
- IR/X-ray **strict simultaneity**: can pinpoint *by itself* jet-disk connection
+SKA, LSST, etc.



Low-Mass X-ray Binaries: seen by **THESEUS**

Key question I: **WHERE** are there?



- IR/X-ray **strict simultaneity**: can pinpoint *by itself* jet-disk connection

Bonus diagnostic: Disk IR lines! Wind IR lines?

+SKA, LSST, etc.

- **IR-spectroscopy**: bright NIR sources (H up to I4 or even I2)



Low-Mass X-ray Binaries: seen by **THESEUS**

Key question 1: **WHERE** are there?

- **Triggers** needed, for large-facility follow ups

Key question 2: energy budget of accretion components

- X-ray sensitivities: **XGIS** can track the hot inflow evolution
- X-ray sensitivities: **SXI** can track the soft disc evolution

Key question 3: jet launching, jet radiative properties

- IR-sensitivities: **IRT** can track the jet spectral evolution
- IR/X-ray **strict simultaneity**: can pinpoint *by itself* jet-disk connection

Bonus diagnostic: Disk IR lines! Wind IR lines? +SKA, LSST, etc.

- **IR-spectroscopy**: bright NIR sources (H up to 14 or even 12)

need tailored simulations, but prospects are very good

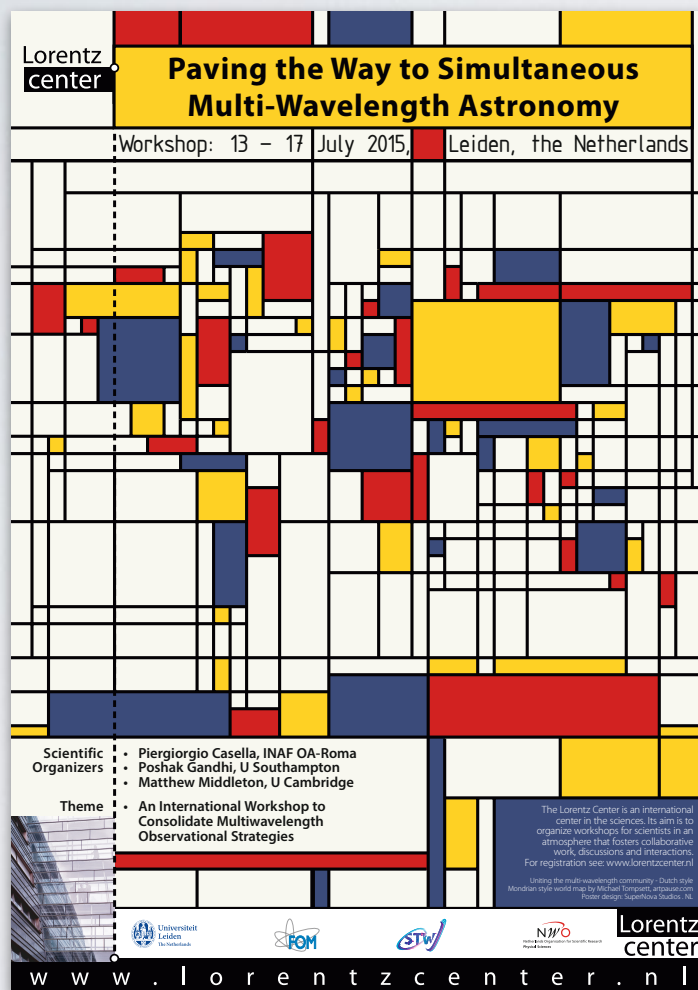


THESEUS in a Multi-Wavelength Context

REPORT/UPDATE ON A
COMMUNITY PROJECT
STARTED IN 2015

<http://www.isdc.unige.ch/SMARTNet/>

Simultaneous Multiwavelength Astronomy Research in Transients Network



A TOOL FOR THE COMMUNITY TO

- ★ optimise observing campaigns
- ★ speed up coordination for rapid transients
- ★ support collaborative approach
- ★ aid collecting & sharing information
- ★ boost communication in the community
- ★ develop community resources

What SMARTNet is

Everyone welcome to join
(see website)

Google Search:
smartnet astronomy

The more the merrier...
...it works if we are all there

What SMARTNet is NOT

NO binding policies, NO tight rules

- ★ use it only if you feel like it
- ★ share only what you want to share
- ★ handle the collaboration as you wish

Coordination Team

Matthew **Middleton** (Southampton, UK)

Piergiorgio **Casella** (OAR, IT)

Poshak **Gandhi** (Southampton, UK)

Enrico **Bozzo** (ISDC, CH)

*"Paving the way to simultaneous
multi-wavelength astronomy"*

New Astronomy Reviews

<https://arxiv.org/abs/1709.03520>

