



THEON

The Extremes of Natures. A comprehensive study of galactic compact objects.

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INAF – Observatory of Rome

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Second year report

Research Streams

Compact Objects (Black Holes, Neutron Stars, White Dwarfs)

Main Collaborators/Institutions

De Martino, Mukai, Falanga, Masetti
INAF, Goddard, ISSI

1. Cataclysmic Variable Stars (CVs)
Accreting white dwarf in binaries

2. Low Mass X-ray binaries (LMXBs)
Accreting black hole/neutron star in binaries

Russell, Lasota, Koljonen, Stella +
NYUAD, INAF, ESO-Finland, Faulkes

3. Ultra Luminous X-ray Sources (ULXs)
Accreting black hole/neutron star in binaries

Israel, Rodriguez, Koljonen +
INAF **← NEW**

4. Magnetars
Isolated Neutron Stars, X-ray pulsars

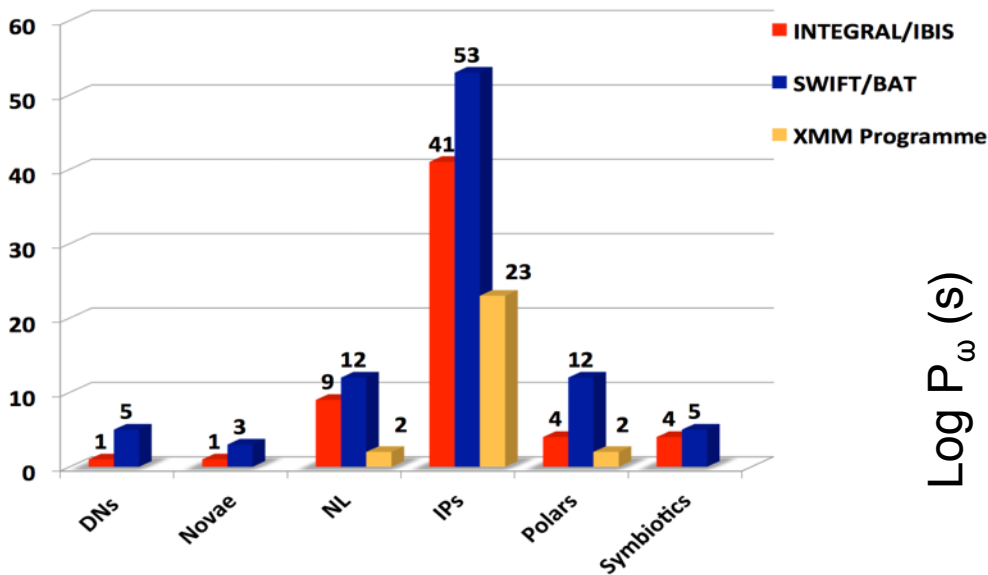
Israel, Stella, Pintore, Turolla +
INAF

CVs

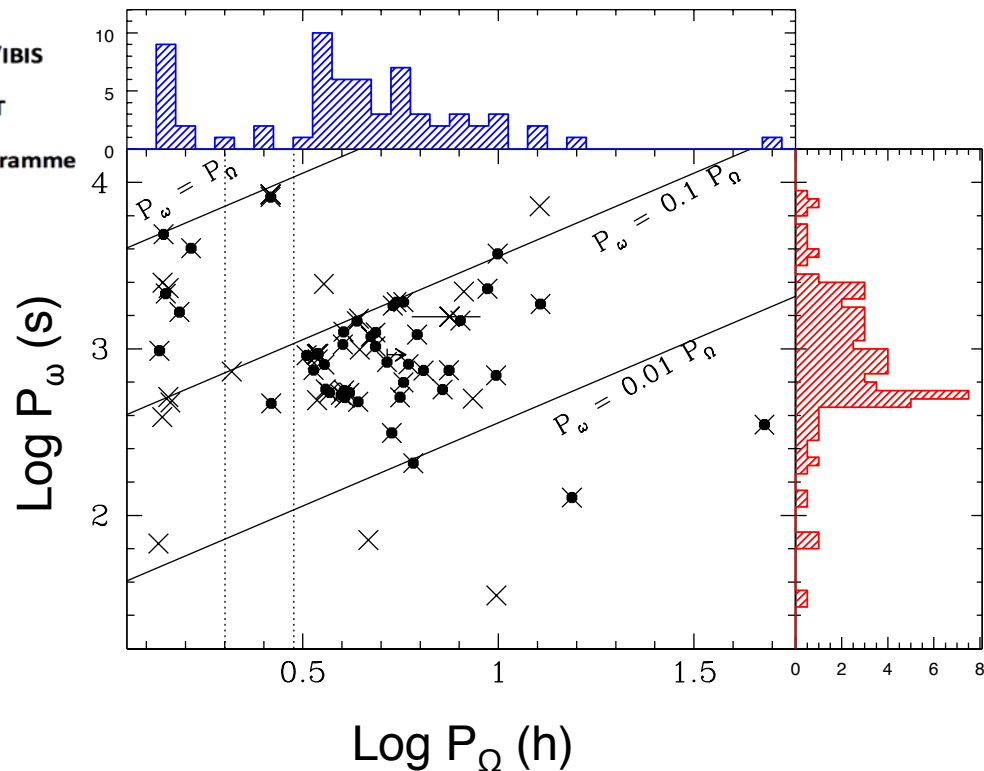
Goal: A Census of Hard X-ray Magnetic Cataclysmic Variables

How: X-ray timing and spectroscopy follow up with XMM-Newton

Classification



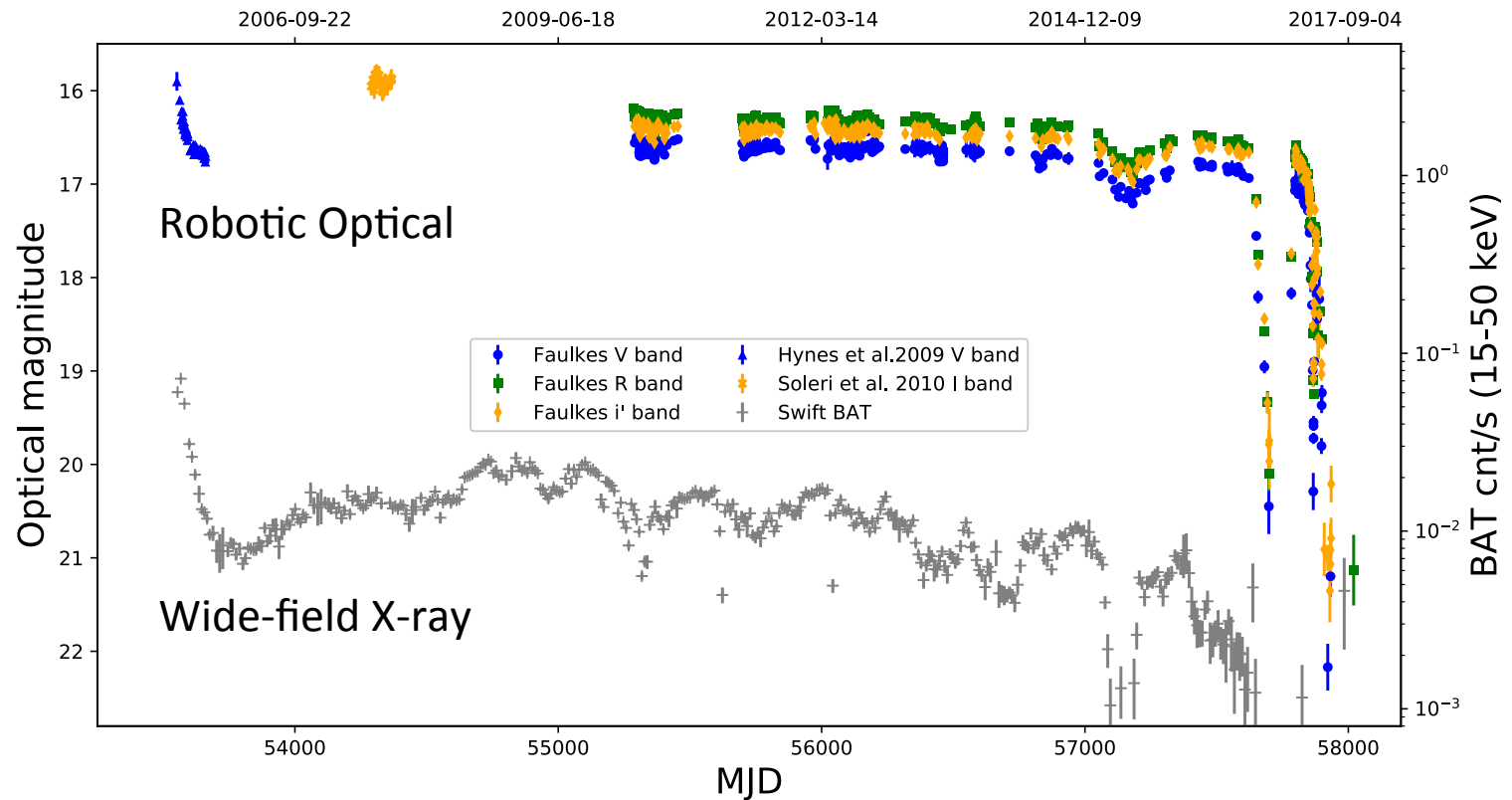
Intermediate Polars Timing properties



LMXBs

Goal: Investigating the physical reasons beyond the properties of LMXBs outbursts

How: Continuous multiwavelength monitoring and new automatic pipeline

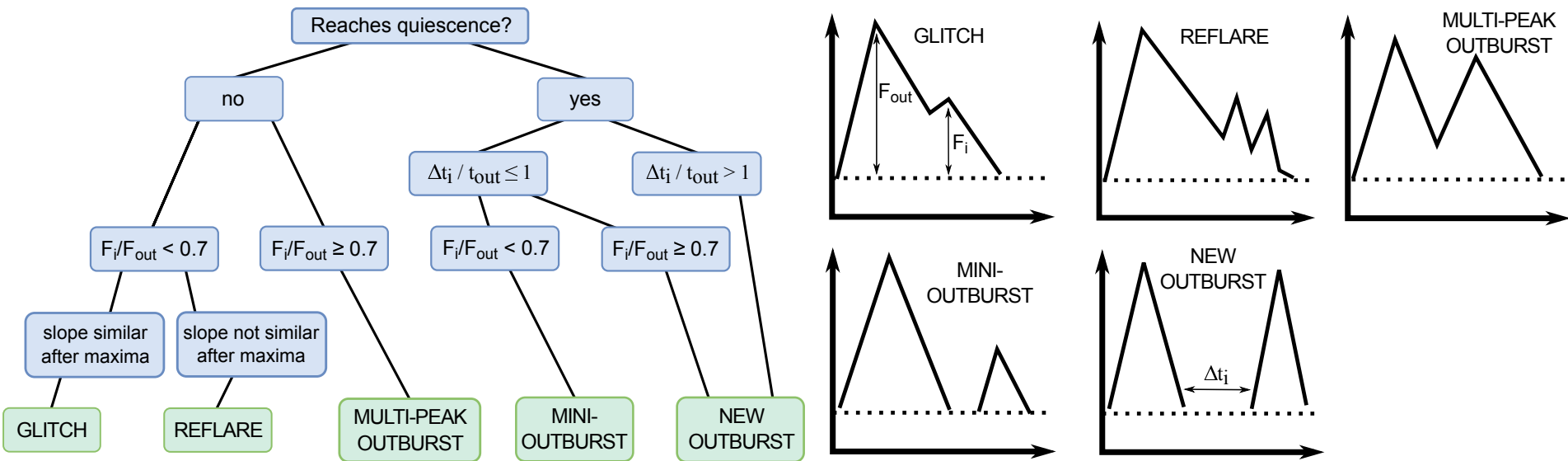


Zhang, Bernardini + 2019

LMXBs

Goal: Investigating the physical reasons beyond the properties of LMXBs outbursts

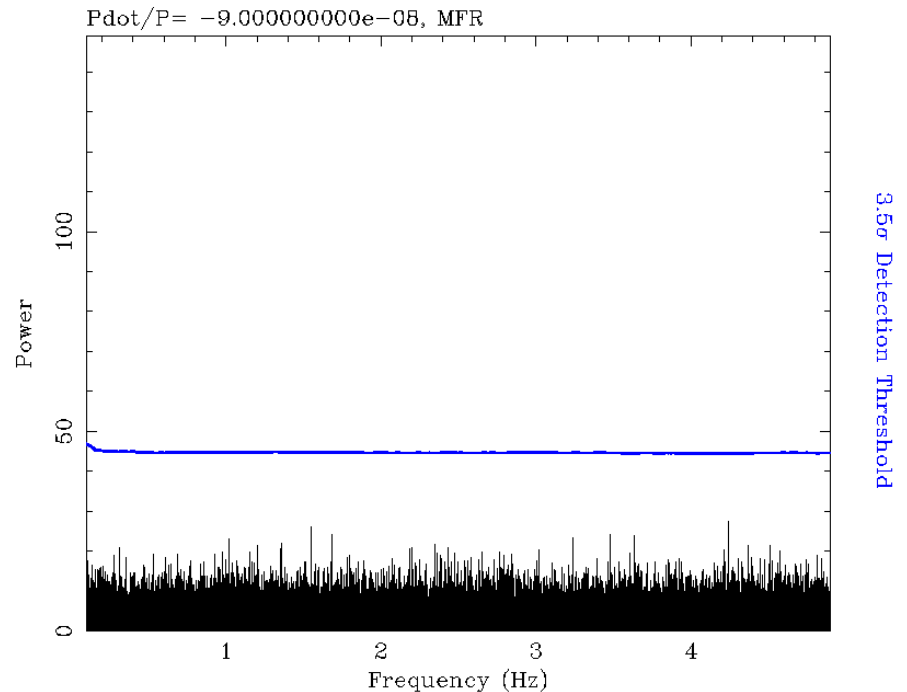
How: Continuous multiwavelength monitoring and new automatic pipeline



ULXs

Goal: Unveil the true population of pulsating ULXs hosting neutron star primaries
How: Applying advanced timing algorithms to XMM Large program / Optical studies

Algorithm timing correction



Rodriguez's algorithm
Rodriguez, Israel, Belfiore, Bernardini + 2019

Visiting, Seminars, Conferences

- New York University Abu Dhabi

23 August—13 October 2019

جامعة نيويورك أبوظبي



- Yerevan State University – CWDB 2019

15—21 September 2019



- INAF collaborations

Invited guests — Dec 2017



Refereed Publications

[2019MNRAS.489.1044B](#)

[2PBC J0658.0-1746: a hard X-ray eclipsing polar in the orbital period gap](#)

Bernardini, F.; de Martino, D.; Mukai, K, et al.

[2019arXiv190906306D](#) (Advance in Space Research in press)

[Hard X-ray Cataclysmic Variables](#)

de Martino, D.; **Bernardini, F.**; Mukai, K. et al.

[2019arXiv190604791R](#) (ApJ in press)

[Discovery of a 2.8 s pulsar in a 2 d orbit High-Mass X-ray Binary powering the Ultraluminous X-ray source ULX-7 in M51](#)

Rodríguez Castillo, G. A.; Israel, G. L.; Belfiore, A; **Bernardini, F.** et al.

[2019ApJ...876....5Z](#)

[Bright Mini-outburst Ends the 12 yr Long Activity of the Black Hole Candidate Swift J1753.5–0127](#)

Zhang, G. -B.; **Bernardini, F.**; Russell, D. M., et al.

[2019MNRAS.484..101B](#)

[The true nature of Swift J0746.3-1608: a possible Intermediate Polar showing accretion state changes](#)

Bernardini, F.; de Martino, D.; Mukai, K, et al.

[2019MNRAS.483.3832P](#)

[The 11 yr of low activity of the magnetar XTE J1810-197](#)

Pintore et al.