



THEON

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

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First year report

Research Streams

Compact Objects (Black Hole, Neutron Star, White Dwarf)

Main Collaborators

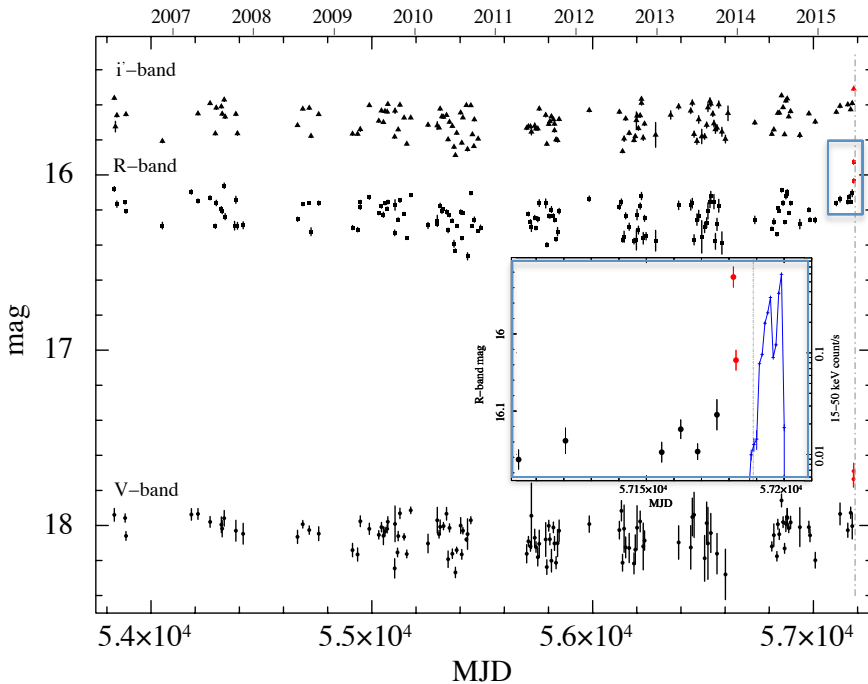
1. Low Mass X-ray binaries (LMXBs)
Accreting black hole/neutron star in binaries
Russell, Lasota, Koljonen, Stella +
2. Cataclysmic Variable Stars (CVs)
Accreting white dwarf in binaries
De Martino, Mukai, Falanga, Masetti
3. Magnetars
Isolated Neutron Stars, X-ray pulsars
Israel, Stella, Pintore, Turolla +
4. Ultra Luminous X-ray Sources (ULXs)
Accreting black hole/neutron star in binaries
Israel, Rodriguez, Koljonen + **← NEW**

LMXBs

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

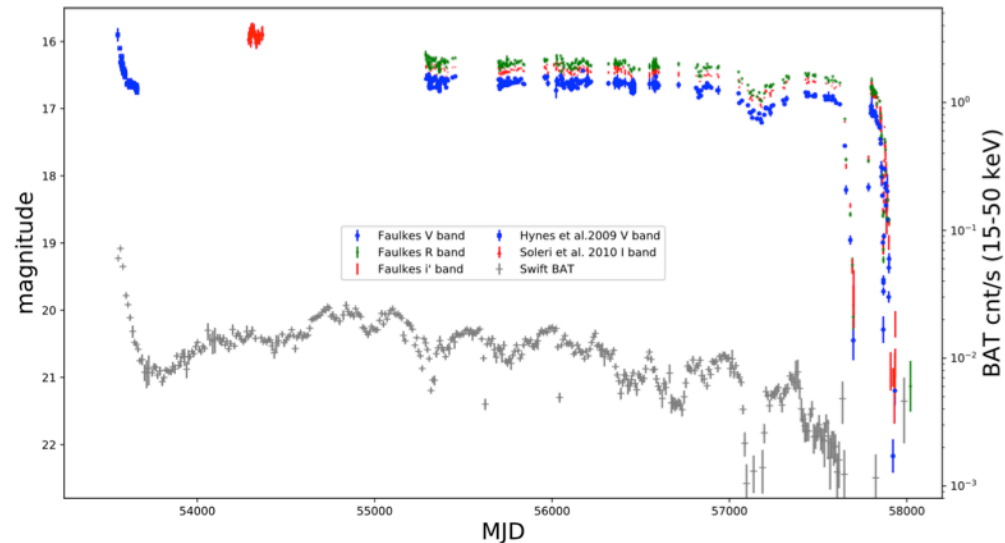
How: Continuous multiwavelength monitoring and new automatic pipeline

Optical Precursor



Bernardini 2016

Minioutbursts



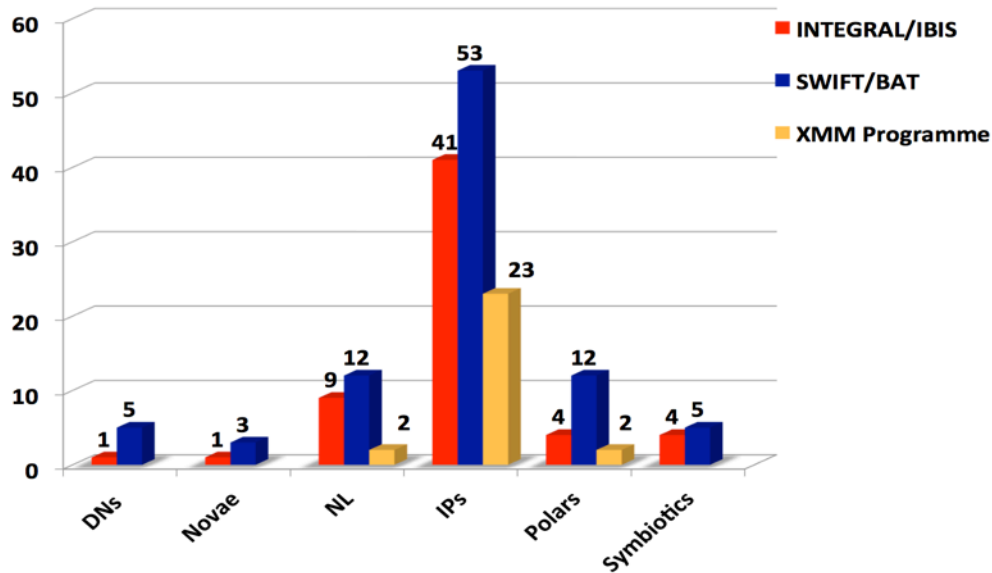
Zhang, Bernardini + 2018 (in press)

CVs

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

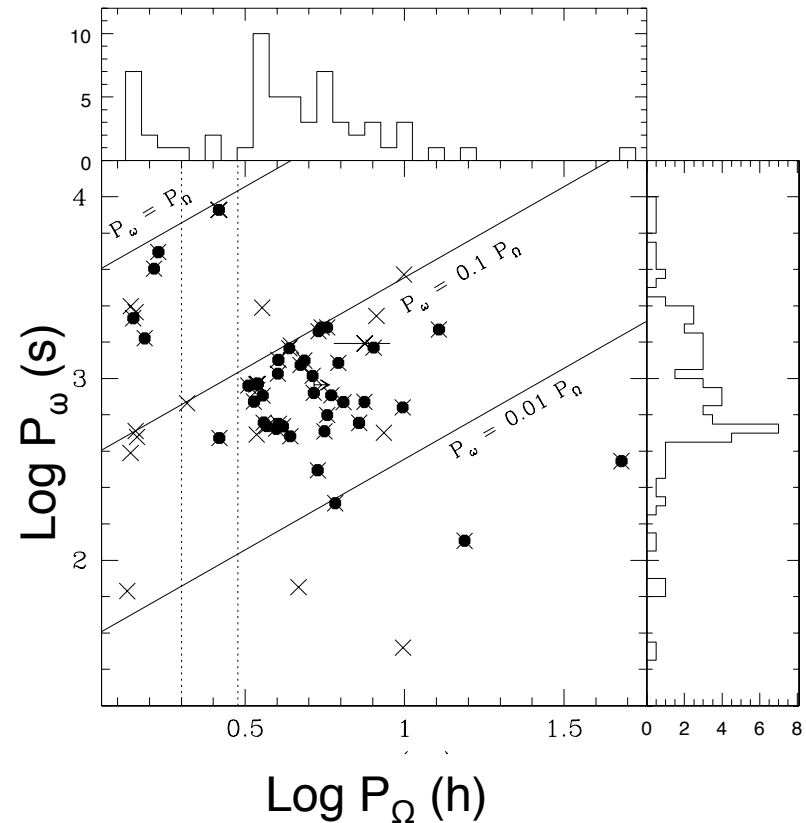
How: X-ray timing and spectroscopy follow up with XMM-Newton

Classification



Bernardini et al. 2012 to 2018
Credit de Martino

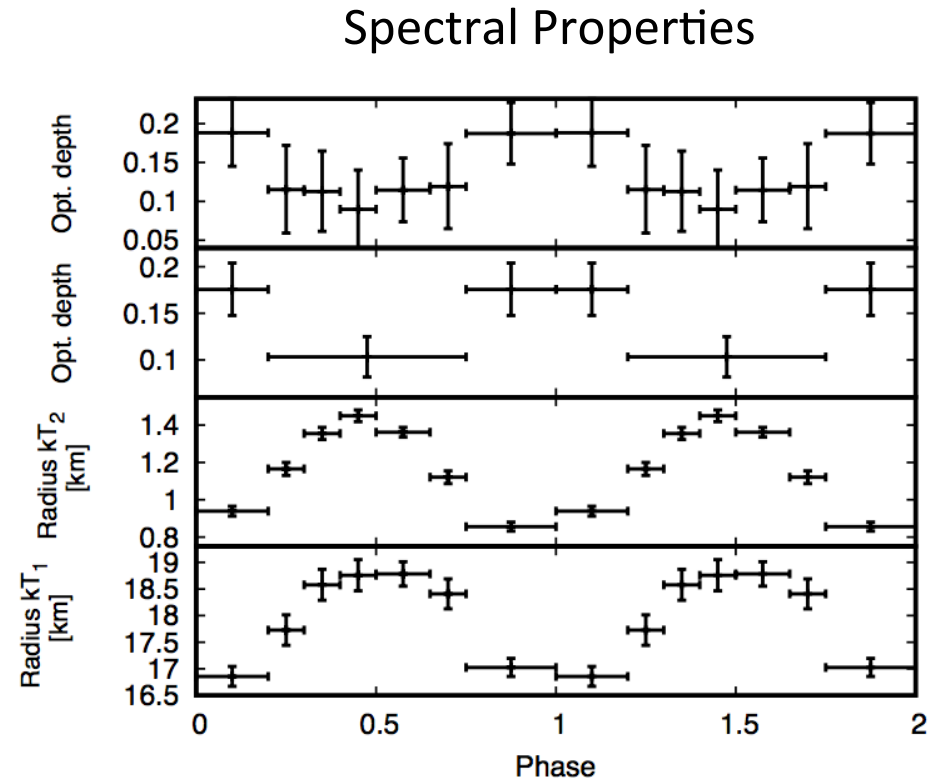
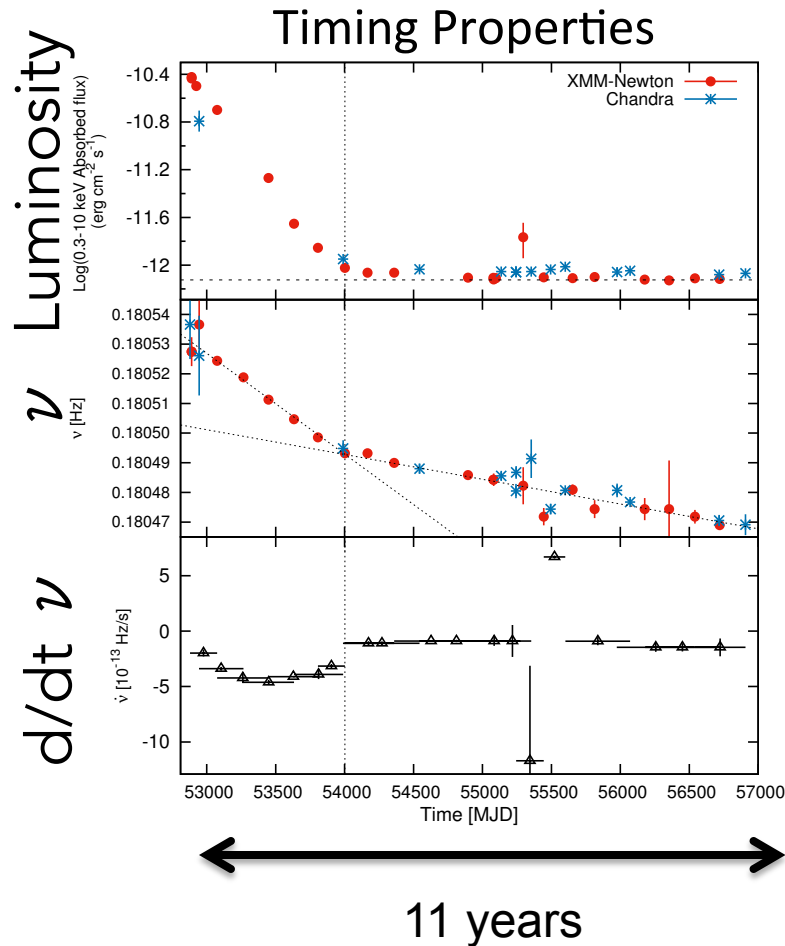
Intermediate Polars Timing properties



Bernardini et al. 2017a,b updating

Magnetars

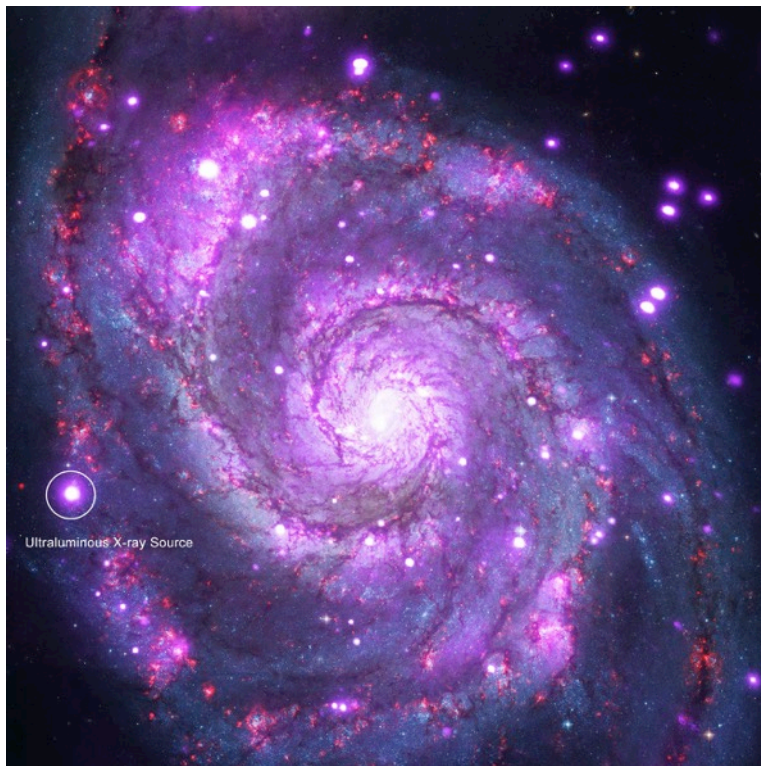
Goal: Unveil the role of the magnetic field in shaping spectral/timing properties
How: Combining cutting-edge spectral and timing analysis with advanced modeling



ULXs

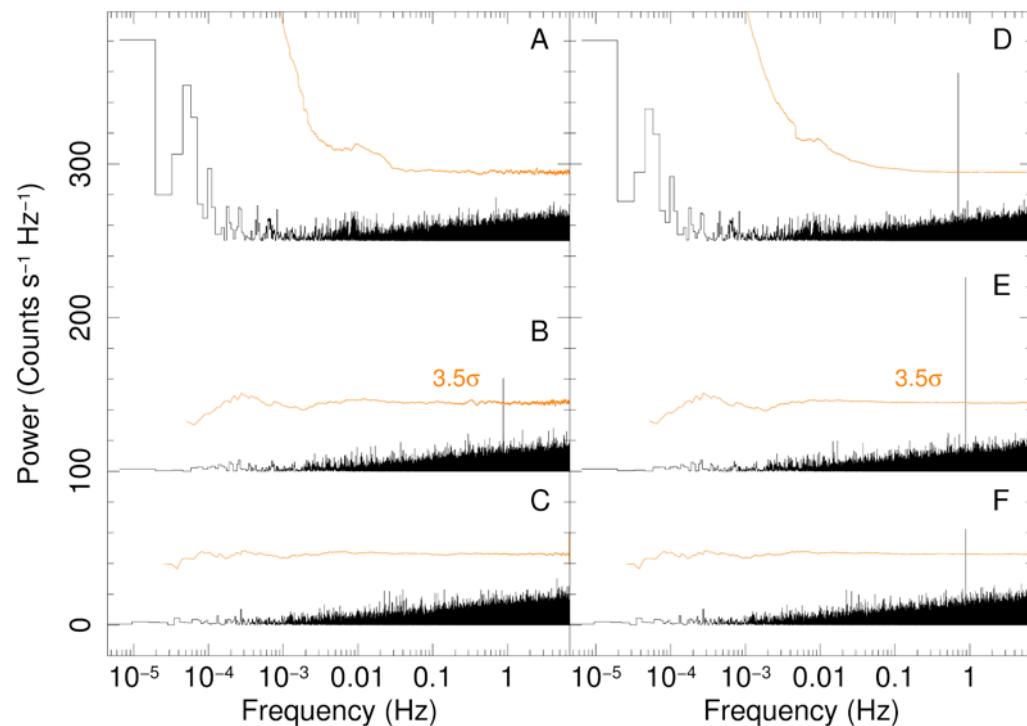
Goal: Unveil the true population of pulsating ULXs hosting neutron star primaries
How: Applying advanced timing algorithms to XMM Large program / Optical studies

Optical counterpart's spectroscopy



Koljonen, Bernardini @work
2 ESO Proposals (VLT with MUSE)

Algorithm timing correction



Rodriguez's algorithm
Israel, Bernardini, Rodriguez @work

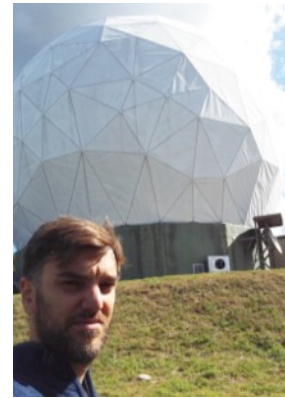
Visiting, Seminars, Conferences

- New York University Abu Dhabi
1—31 November 2017

جامعة نيويورك أبوظبي



- Finnish Center for Astronomy with ESO
1—31 August 2018



- Univ. Padova - CNOC 2017
Invited Speaker — Dec 2017



Refereed Publications

07/2018

IGR J14257-6117, a magnetic accreting white dwarf with a very strong strong X-ray orbital modulation. **Bernardini, F.**; de Martino, D.; Mukai, K.; Falanga, M. MNRAS, 478, 1185.

<http://adsabs.harvard.edu/abs/2018MNRAS.478.1185B>

05/2018

HST spectrum and timing of the ultracompact X-ray binary candidate 47 Tuc X9. Tudor, V. et al. MNRAS, 476, 1889.

<http://adsabs.harvard.edu/abs/2018MNRAS.476.1889T>

01/2018

Optical Precursors to Black Hole X-Ray Binary Outbursts: An Evolving Synchrotron Jet Spectrum in Swift J1357.2-0933. Russell, D. M.; Qasim, A. A., **Bernardini, F.** et al. ApJ, 852, 90.

<http://adsabs.harvard.edu/abs/2018ApJ...852...90R>

12/2017

The accretion environment of supergiant fast X-ray transients probed with XMM-Newton. Bozzo, E.; **Bernardini, F.**; Ferrigno, C.; Falanga, M.; Romano, P.; Oskinova, L. A&A, 698, 128.

<http://adsabs.harvard.edu/abs/2017A%26A...608A.128B>

12/2017

IGR J19552+0044: A new asynchronous short period polar. Filling the gap between intermediate and ordinary polars. Tovmassian, G. et al. A&A, 608, 36.

<http://adsabs.harvard.edu/abs/2017A%26A...608A..36T>

10/2017

Broad-band characteristics of seven new hard X-ray selected cataclysmic variables. **Bernardini, F.**; de Martino, D.; Mukai, K.; Russell, D. M.; Falanga, M.; Masetti, N.; Ferrigno, C.; Israel, G. MNRAS, 470, 4815.

<http://adsabs.harvard.edu/abs/2017MNRAS.470.4815B>

10/2017

Up and Down the Black Hole Radio/X-Ray Correlation: The 2017 Mini-outbursts from Swift J1753.5-0127. Plotkin, R. M. et al. ApJ, 848, 92.

<http://adsabs.harvard.edu/abs/2017ApJ...848...92P>

09/2017

Disc-jet coupling in low-luminosity accreting neutron stars. Tudor, V. et al. MNRAS, 470, 324.

<http://adsabs.harvard.edu/abs/2017MNRAS.470..324T>