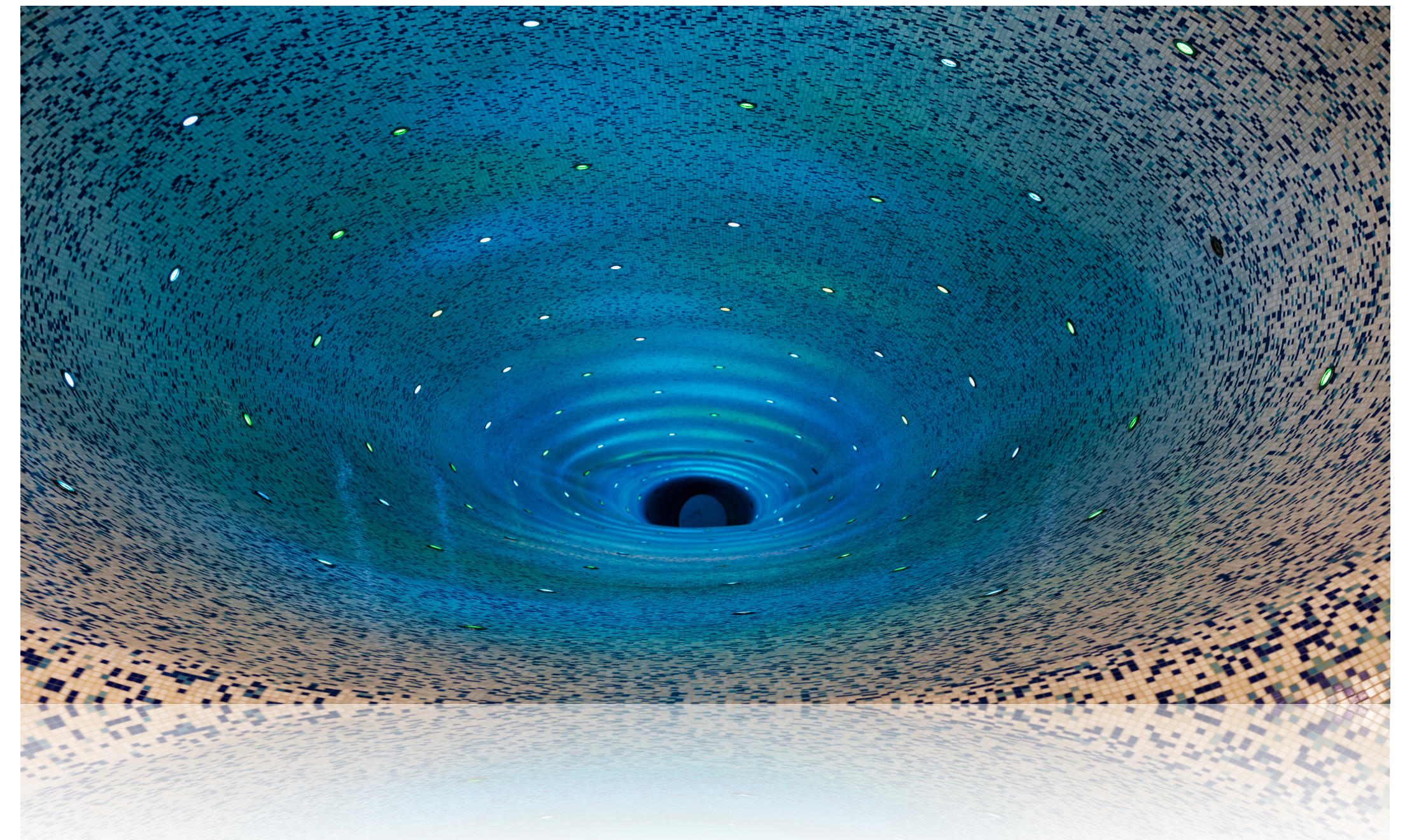


RSN4



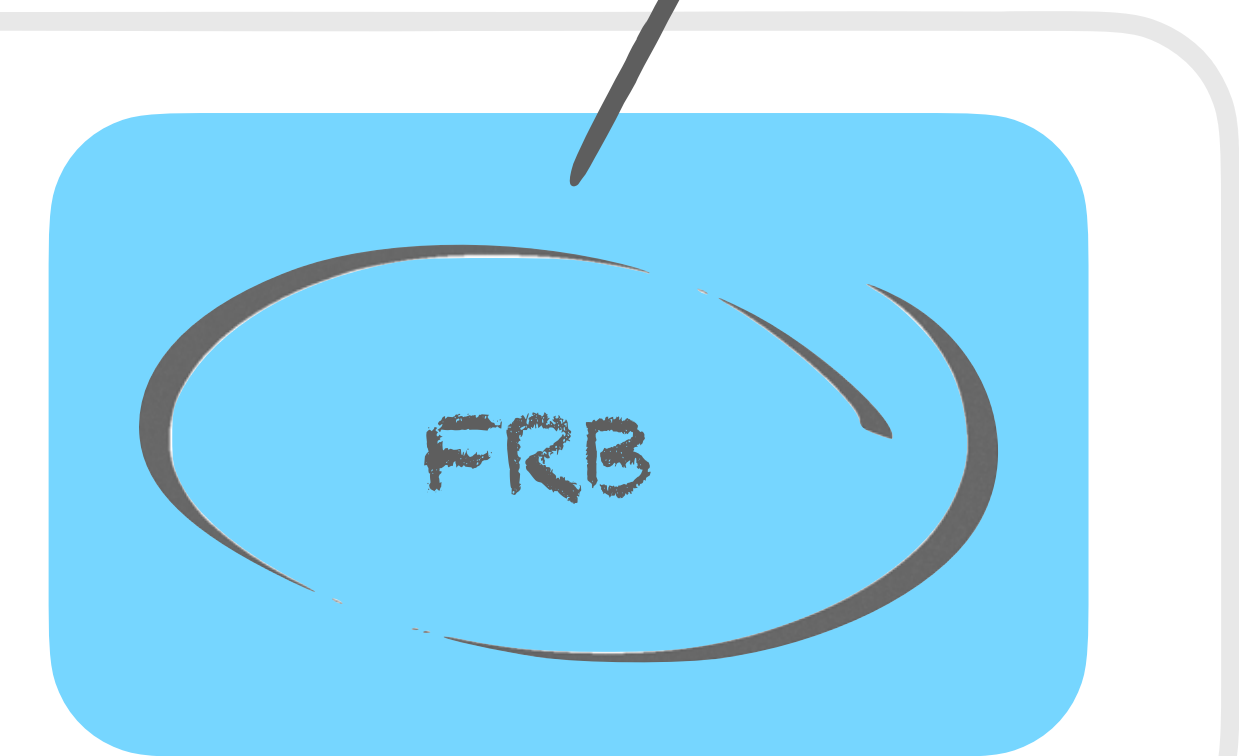
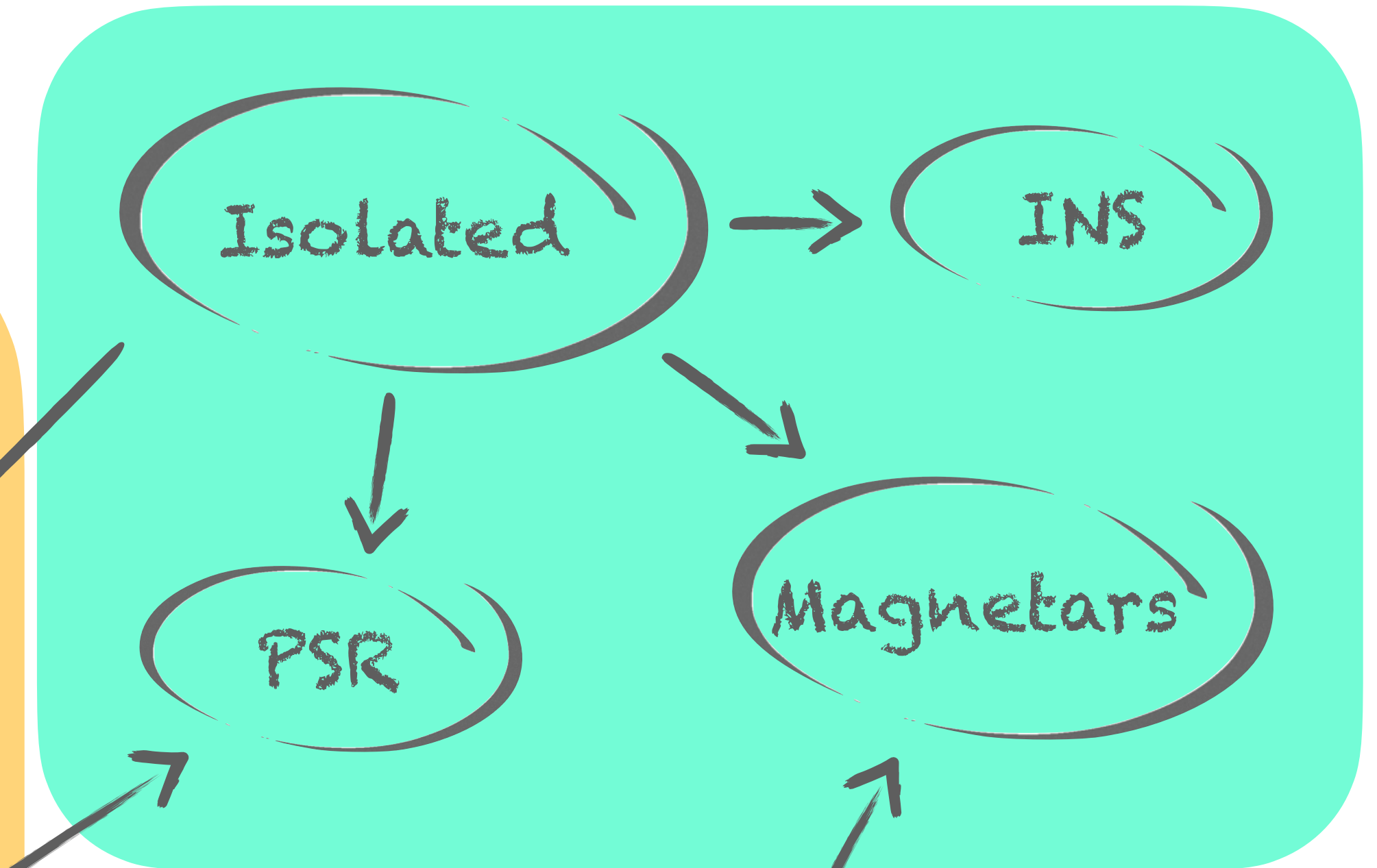
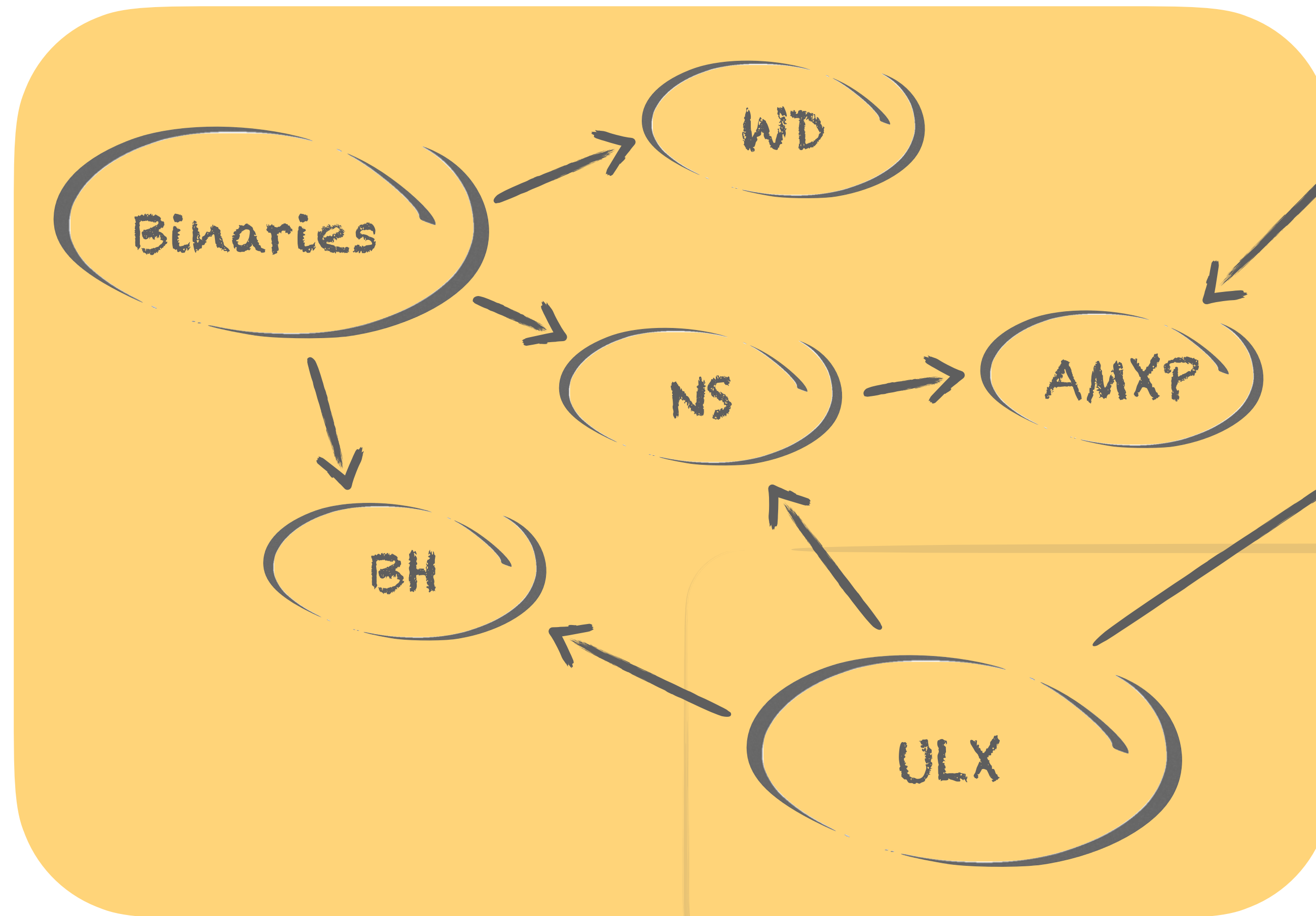
Linee di ricerca RSN4: Oggetti compatti galattici

Tomaso M. Belloni (INAF-OAB)

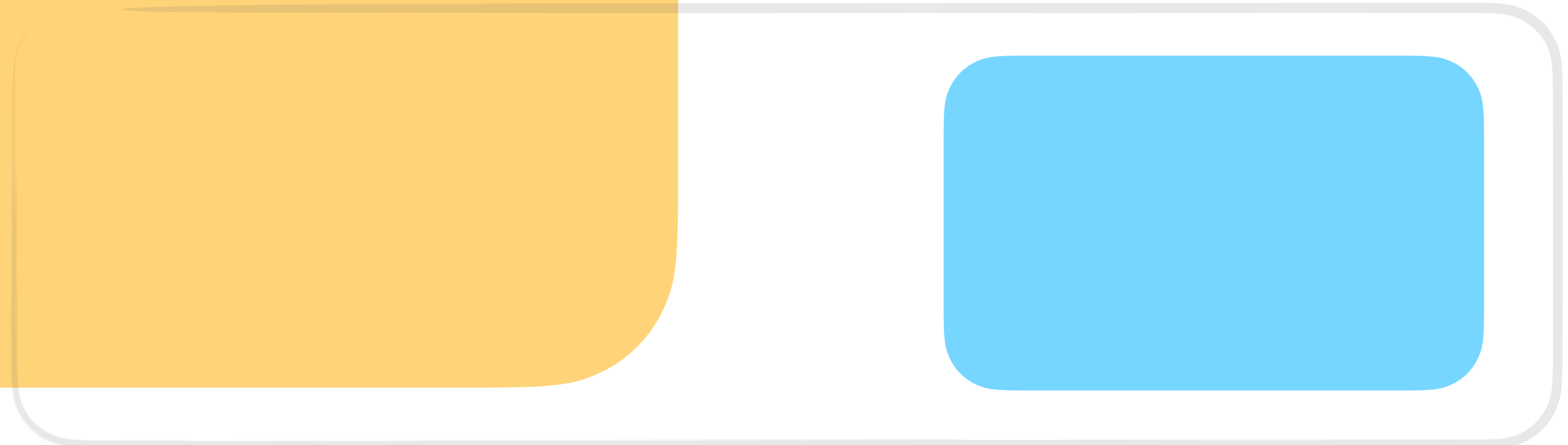
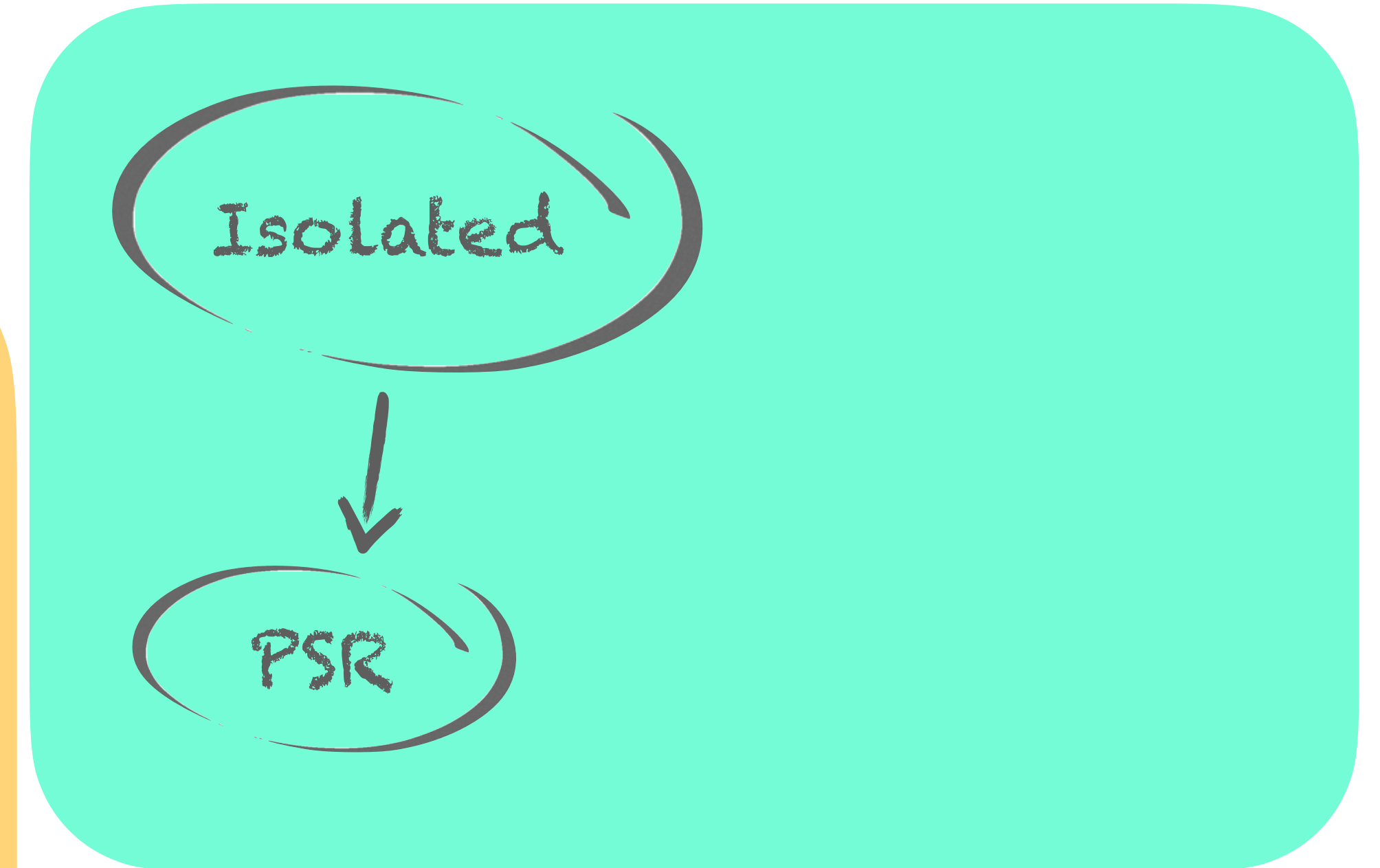
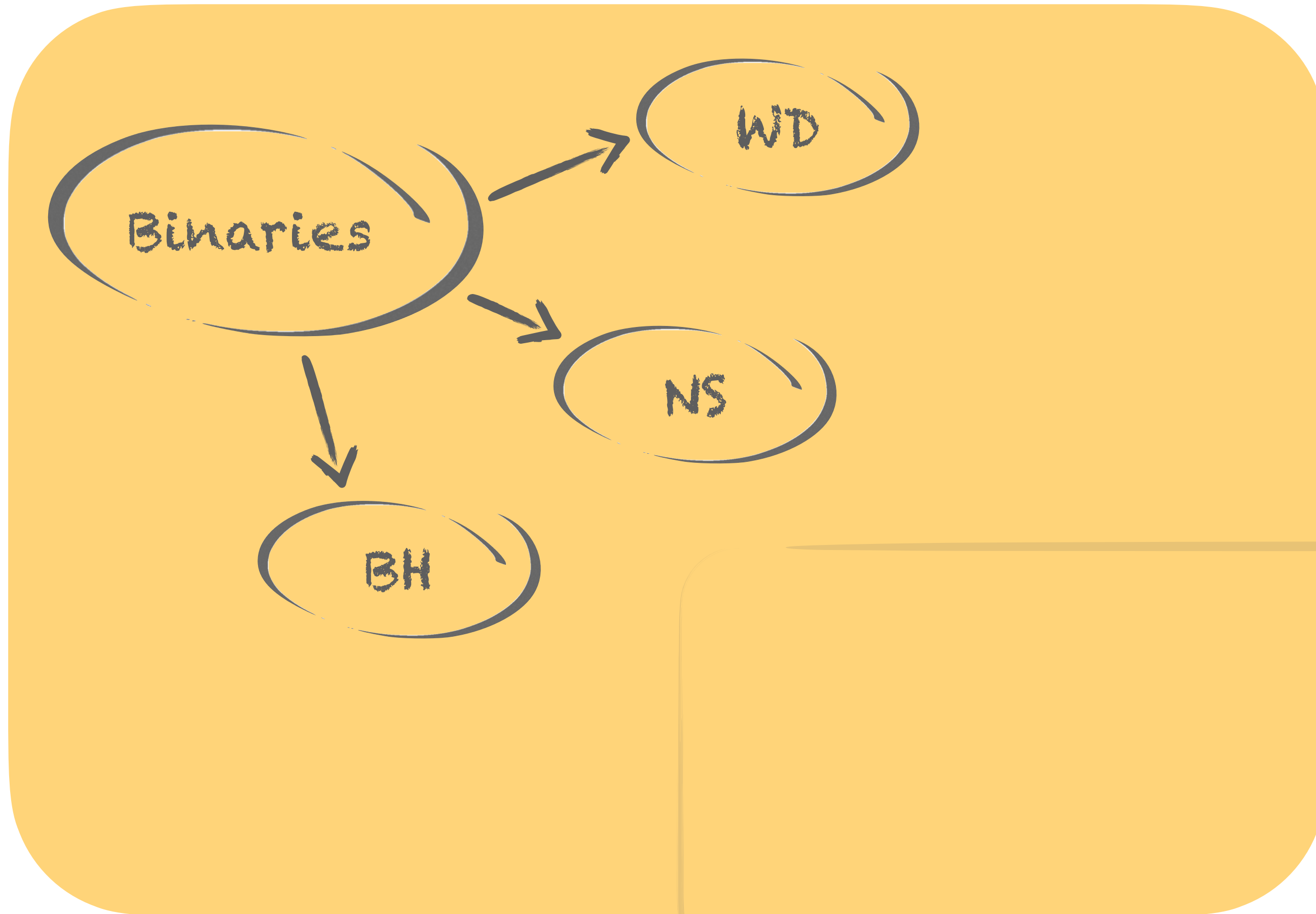


Compacte "galattiche"

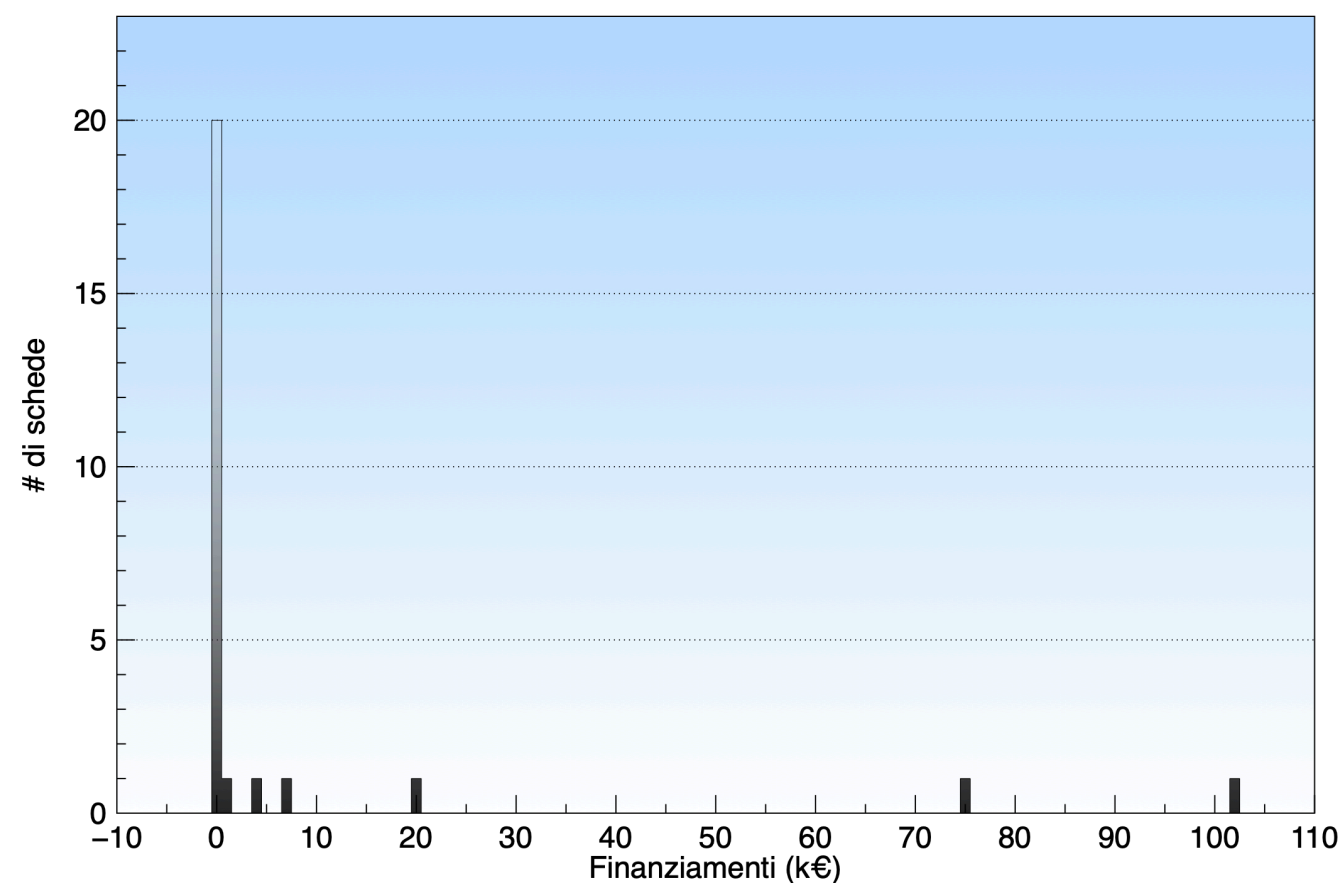
RSN4



Compatte "galattiche"



Schede



Stelle di neutroni	202
Nane bianche	7
Buchi neri	0



#	GC O	TITLE	FT E	FUND S
5	B1	Study of multi-wavelength variability from JETS in X-ray binaries	4	0
19	B2	Studio pancromatico degli FRB: osservazioni, teoria e analisi statistiche.	22	0
23	B3	Studio dell'accrescimento in Supergiant Fast X-ray Transients e altri tipi di High Mass X-ray Binaries	4	0
34	B4	High-Energy observations of Stellar-mass Compact Objects: from CVs to the most luminous X-Ray Binaries	5	0
35	B5	MAGNETAR ISOLATE E IN SISTEMI BINARI	15	4
44	B6	Osservazioni radio single-dish e VLBI di sistemi binari X nel contesto di osservazioni simultanee multi-frequenza	4	0
49	B7	Osservazioni a multi-lunghezza d'onda di sorgenti di alta energia	4	0
50	B8	Accrescimento e bruciamento nucleare nelle binarie simbiotiche	1	0
53	B9	Osservazioni di Fast Radio Bursts con la Croce del Nord	8	75
58	B10	Glancing through the extremes of wind-fed massive binaries: from classical HMXBs to SFXTs	1	0
60	B11	High-energy Emission from Accreting Pulsars	8	0
62	B12	La Scienza delle Pulsar negli Ammassi Globulari	4	20

#	GC O	TITLE	FT E	FUND S
69	B13	MultiBlackNeutrons: MULTI-wavelength studies of BLACK holes and non-pulsating NEUTRON star X-ray binaries	12	0
75	B14	Novae in outburst: alta energia ed alta risoluzione spettrale	1	0
76	B15	Probing the geometry of accretion: from theory to observations	5	0
79	B16	Multiband characterization of white dwarf X-ray binary population	3	7
82	B17	Studio a multi-lunghezza dell'emissione dalla magnetosfera delle pulsar	3	0
85	B18	Accrescimento e magnetismo in novae e simbiotiche	1	0
87	B19	Ricerca di radio pulsar in sorgenti FERMI non identificate	5	1
88	B20	Be with white dwarfs companion	1	0
94	B21	The hottest compact stars in the Local Group and beyond	1	0
96	B22	Pulsar al millisecondo in sistemi binari compatti	14	102
108	B23	Polarized X-rays from LMXB	5	0
111	B24	New Eyes On Novae	0	0

TOTALI	
FTE totali	Fondi totali
131	209

Schede (2)



	TITLE	FT E	FUND S
9	Multiwavelength identification of high-energy cosmic sources	6	0
7	Partecipazione italiana alla missione Swift della NASA	21	600
13	Very Long Baseline Interferometry	47	1150
24	The high energy transient sky INTEGRAL-2	5	0
26	Il progetto "NOT Transient Explorer"	3	260
32	Astorivelatore Gamma a Immagini LEggero	27	210
37	PROgram for Gamma Ray astrophysics with chErenkov obServatorieS	169	10000
39	Particles ANd Gamma-rays from the EArth	0	0
42	INTEGRAL-0; The International Gamma-Ray Astrophysics Laboratory	14	150
47	Scientific data exploitation from the Chinese Insight-HXMT mission	2	0
57	Sfruttamento scientifico della missione Fermi	12	140
61	Studio sistematico delle sorgenti rivelate da XMM-Newton e Chandra nel dominio temporale.	10	0
70	Galactic Plane Scans/INTEGRAL-3	6	0
71	NTEGRAL-1; The High Energy All Sky Survey (HEASS), a combined INTEGRAL/IBIS and Swift/BAT survey	10	0

	TITLE	FT E	FUND S
78	Fast Photon Counting Optical Astronomy with Aqueye+ and Iqueye	7	17
86	Campo Imperatore Transients Observer	7	0
90	Imaging X-ray Polarimetry Explorer	23	0
4	PLUTO: un codice numerico per simulazioni di plasmi astrofisici	3	0
6	Development of (Polarimetry-aware) Open Source Spectral Timing software	5	0
18	General High-energy Aperiodic Timing Software	3	0
8	Fundamental physics from astrophysical data	2	0
10	Relativistic jets: particle acceleration, emission and multi messenger role	4	0
15	Plasma Astrophysics	6	0
45	Dissipazione ed emissione di alta energia in flussi relativistici	3	0
74	Modelli numerici per l'Astrofisica delle Alte Energie	2	0
84	Processi lineari e non lineari in plasmi astrofisici	2	0
101	RElativistic THERmodynamics of jets and Accretion Disks	1	0
106	Theory Grant: "PEACE: Probing Extreme Acceleration in Cosmic Environment"	0	0

Finanziamenti 2022



Large grants

Mereghetti	Magnetars	126	50% - 45%
Possenti	Pulsar/black-hole systems and other jewels in the casket of globular cluster stellar populations	200	
Papitto	Uncovering the optical beat of the fastest magnetised neutron stars (FANS)	150	

Mini-grants

Motta	EJECTA: Extreme JETs from Compact Accretors	18	7% - 7%



GTO-grants

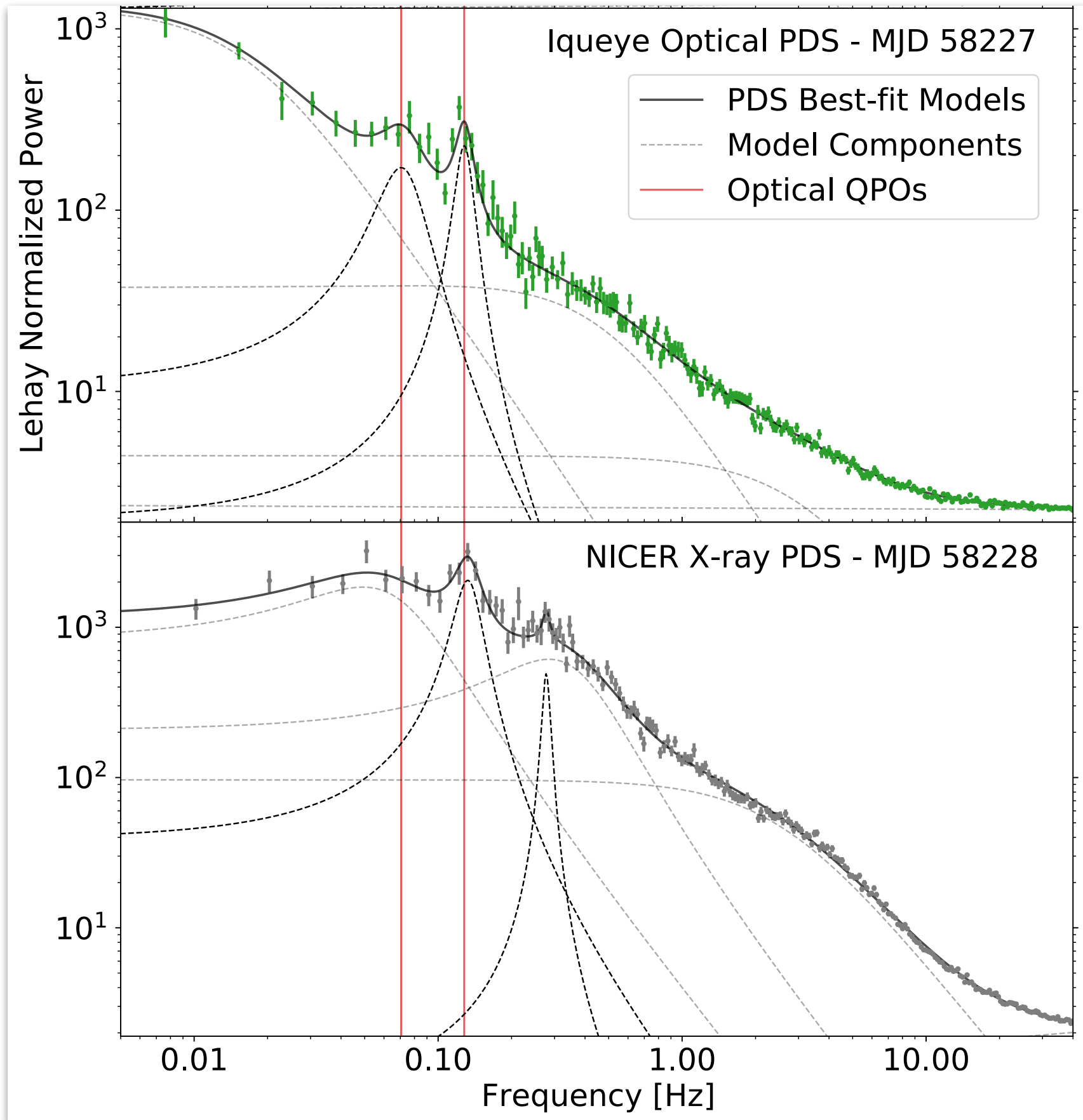
Israel	Large: Too B or not too B: the quest for the PULX accretion 56000 mechanism	56	50% - 55%
Giroletti	Normal: Resolving and tracking with VLBI the shocked ejecta of the 2021 outburst of RS Oph	45	
Del Santo	Normal: ACE-BANANA: ACcretion-Ejection physics in Black hole And Neutron star X-ray biNaries	36	

Dal PTA 2022-2024

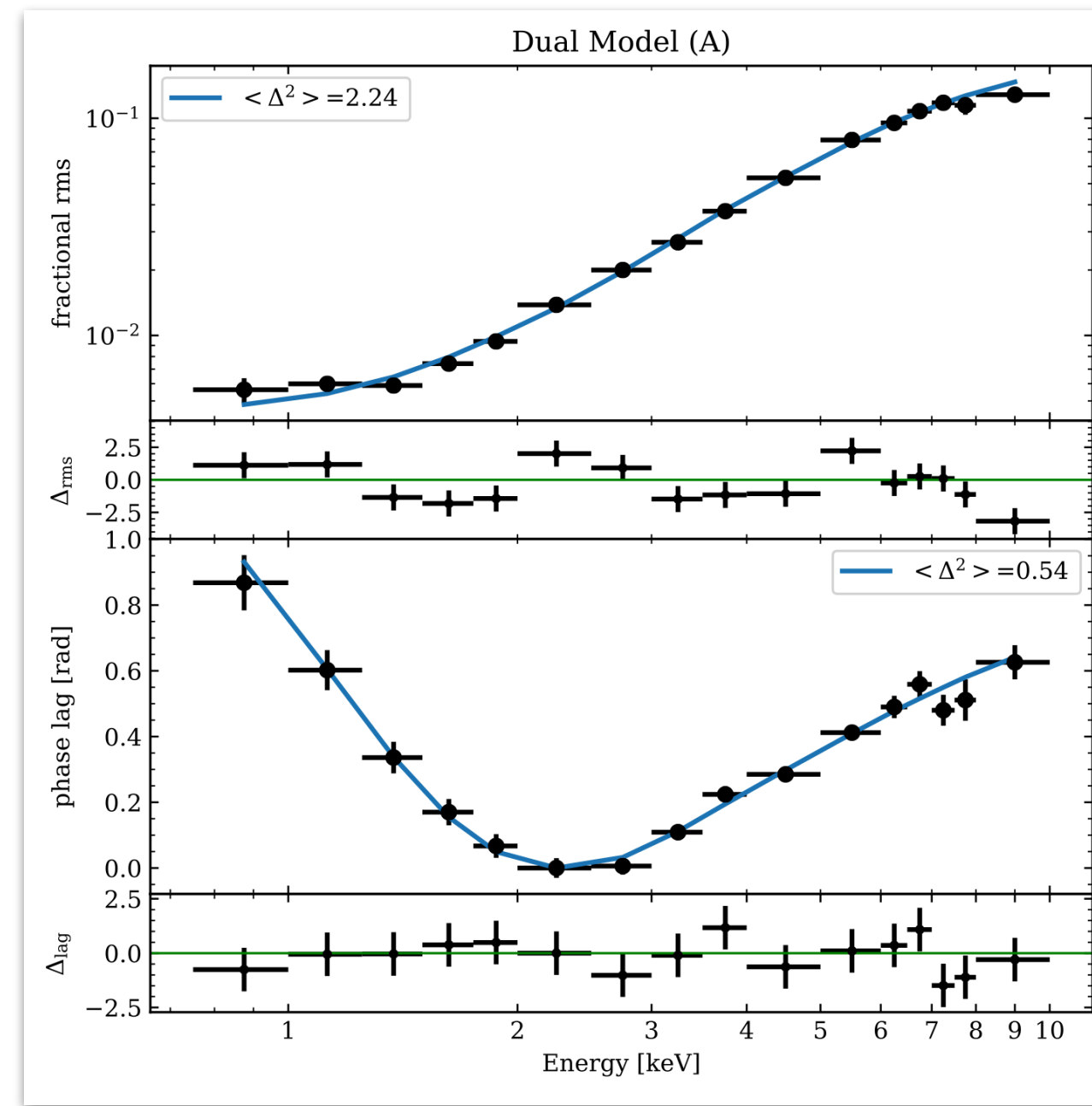


Gli obiettivi per il prossimo triennio sono: i) la comprensione dei processi fisici e della geometria dell'accrescimento di materia e dei meccanismi di produzione di getti e/o venti in oggetti compatti galattici ed extragalattici (binarie X, ULX, TDE, AGN); ii) lo studio e comprensione della natura transiente dei TDE; iii) sfruttamento dell'aumento di sensibilità dei precursori di SKA (e.g. MeerKAT, LOFAR) per la ricerca di pulsar e per la fisica degli AGN; iv) studio dell'interazione tra magnetosfere di stelle di neutroni in sistemi binari e materia in accrescimento a diversi regimi di luminosità; v) comprensione dei meccanismi di accelerazione di particelle attraverso lo studio nel gamma di pulsar, binarie e AGN; vi) comprensione della natura e dell'origine dei FRBs; vii) indagine sulla formazione e struttura di getti relativistici in mergers e collapsar e la caratterizzazione di futuri eventi GRB/SN; viii) studio dei processi esplosivi nelle novae e SNe e loro legami con i sistemi progenitori e con i residui delle esplosioni; ix) indagine su se e come SNR giovani possano accelerare particelle ad energie di 1 PeV e studio di sorgenti alternative per i CR galattici alle energie più alte; x) studio degli aloni gamma al TeV e implicazioni per l'origine e la propagazione dei CR; xi) comprensione dell'accelerazione da shock e da riconnessione magnetica, in regime relativistico e non (GRB, SN, AGN); xii) studio dell'emissione di neutrini da parte di sorgenti variabili ed altamente energetiche (GRB, SNe, Blazar); xiii) ricerca e caratterizzazione delle controparti elettromagnetiche delle GW; xiv) comprensione dei processi di nucleosintesi e dell'origine degli elementi pesanti nell'Universo; xv) studio delle sorgenti dei CR extragalattici e della componente multi-messenger (neutrini e fotoni) nella regione delle energie estreme.

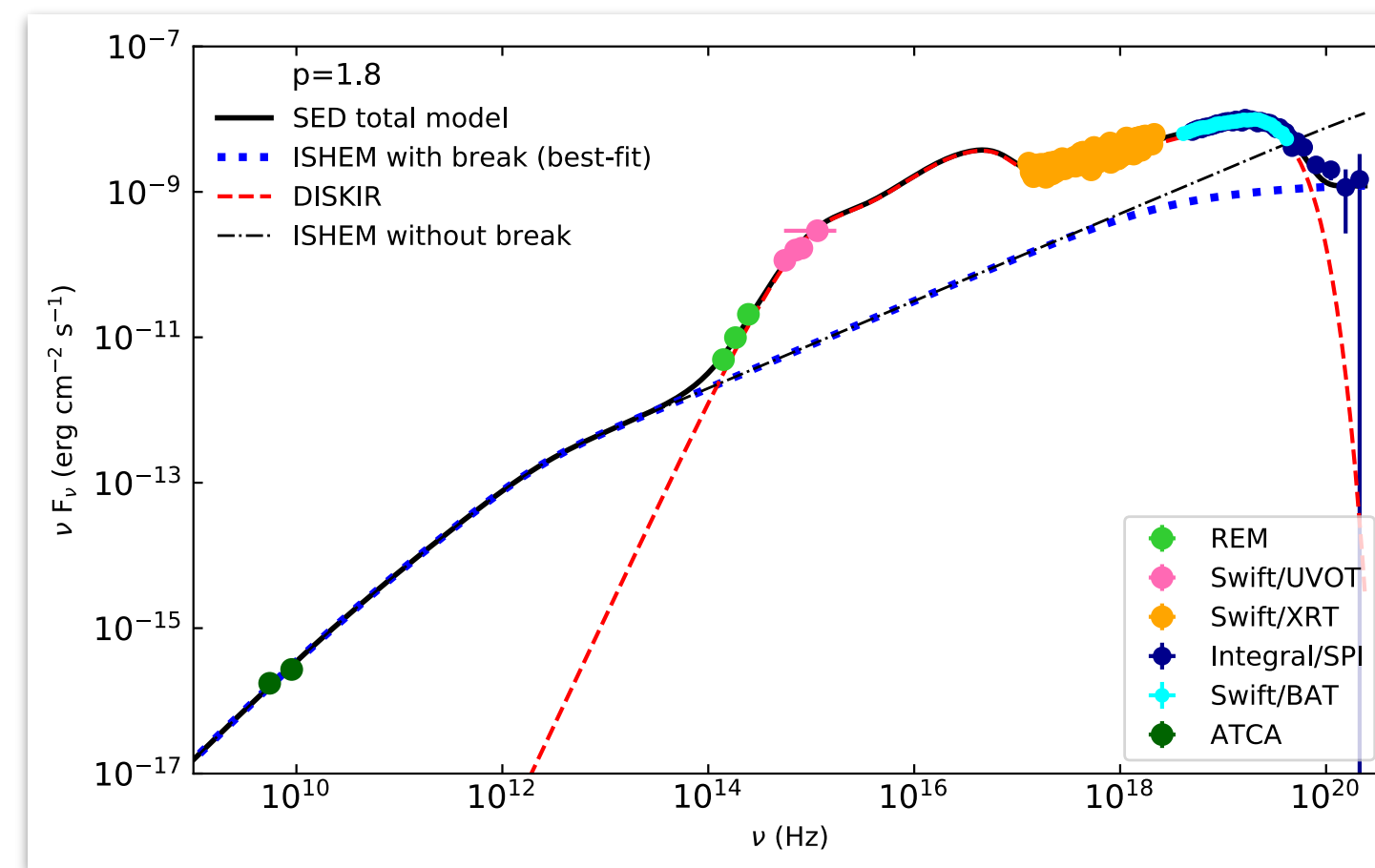
Black-hole binaries



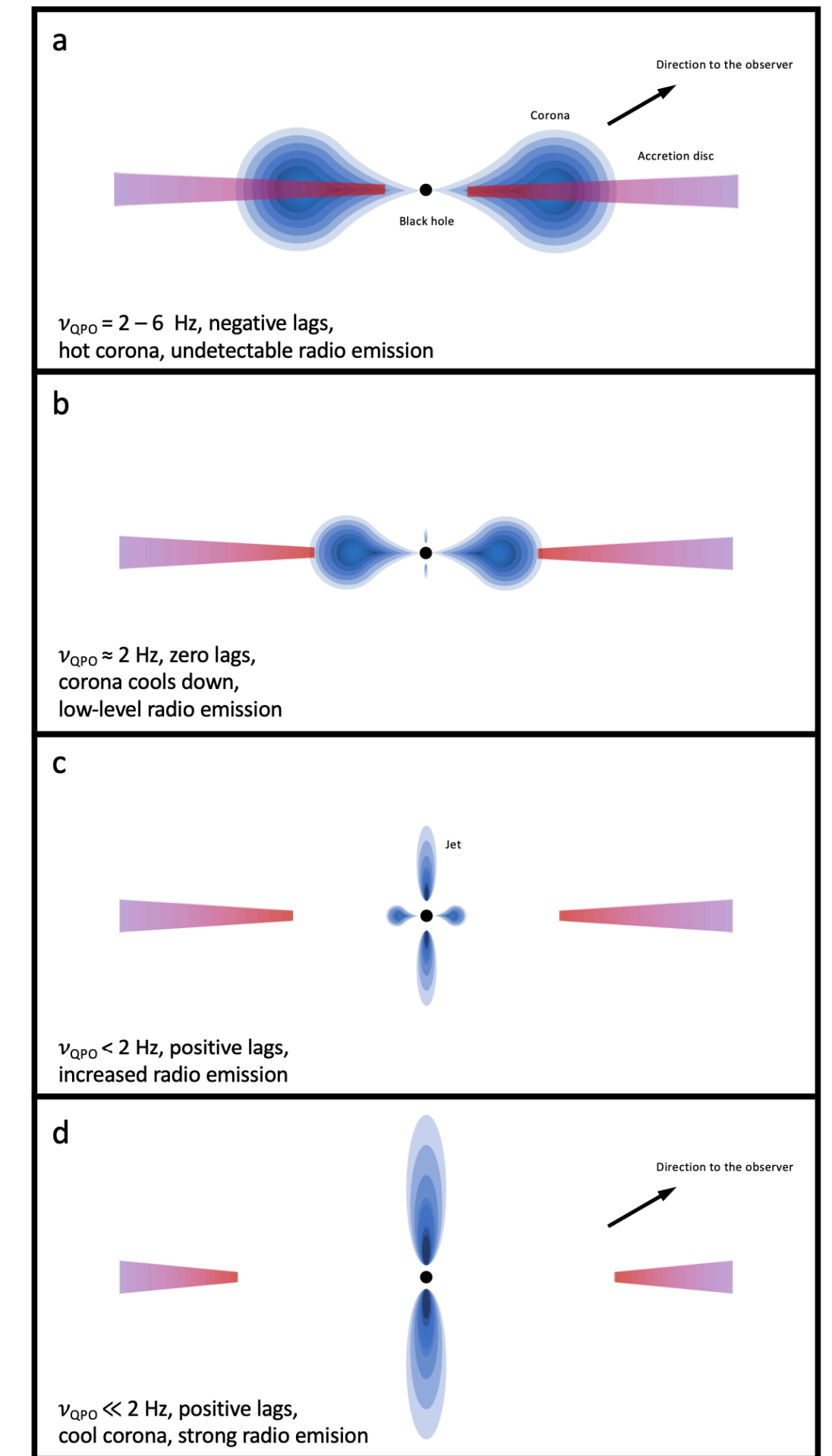
Fiori et al. (2021)



Belloni et al., (2020), García et al. (2022)



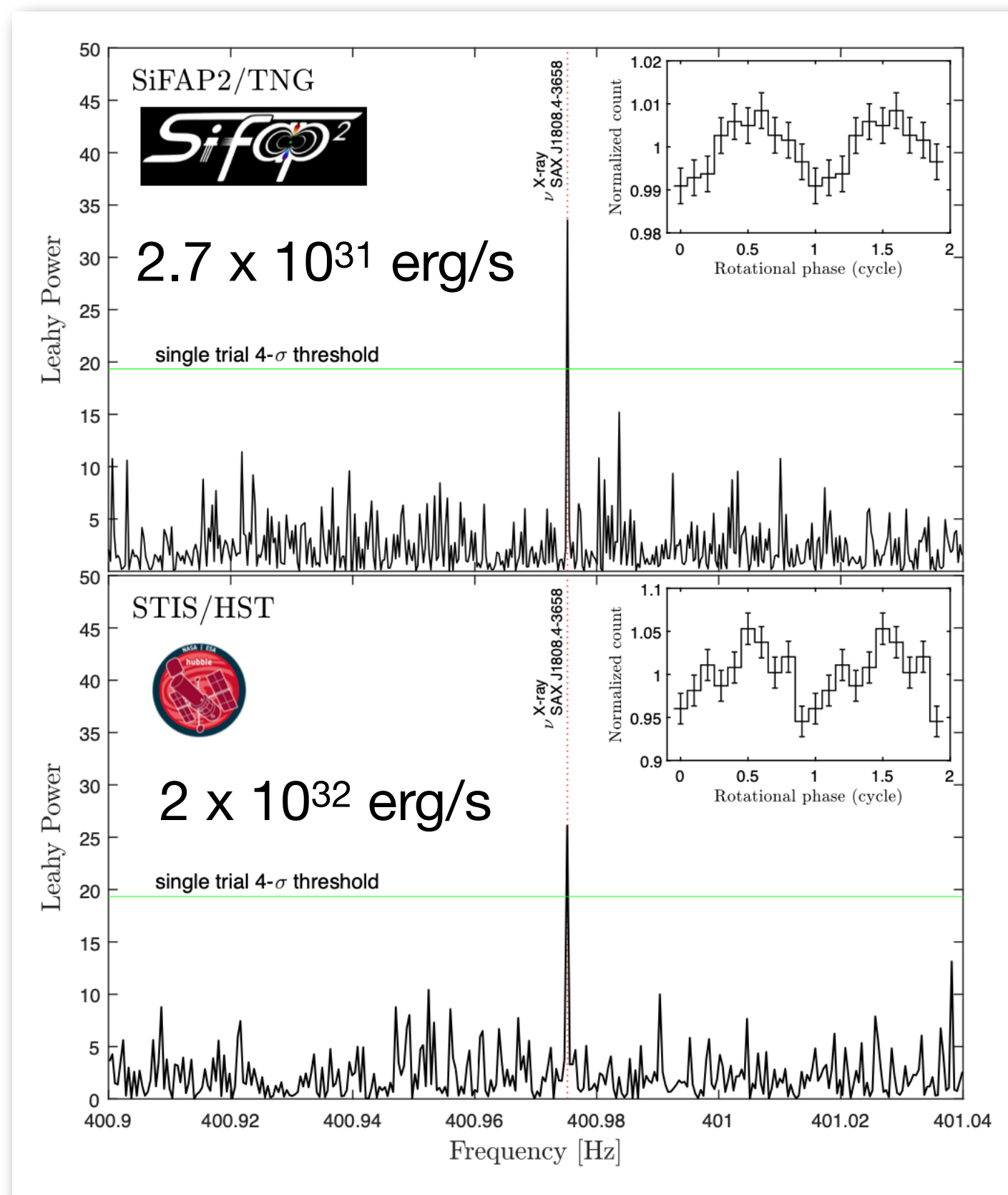
Bassi et al. (2020)



Méndez et al. (2022)

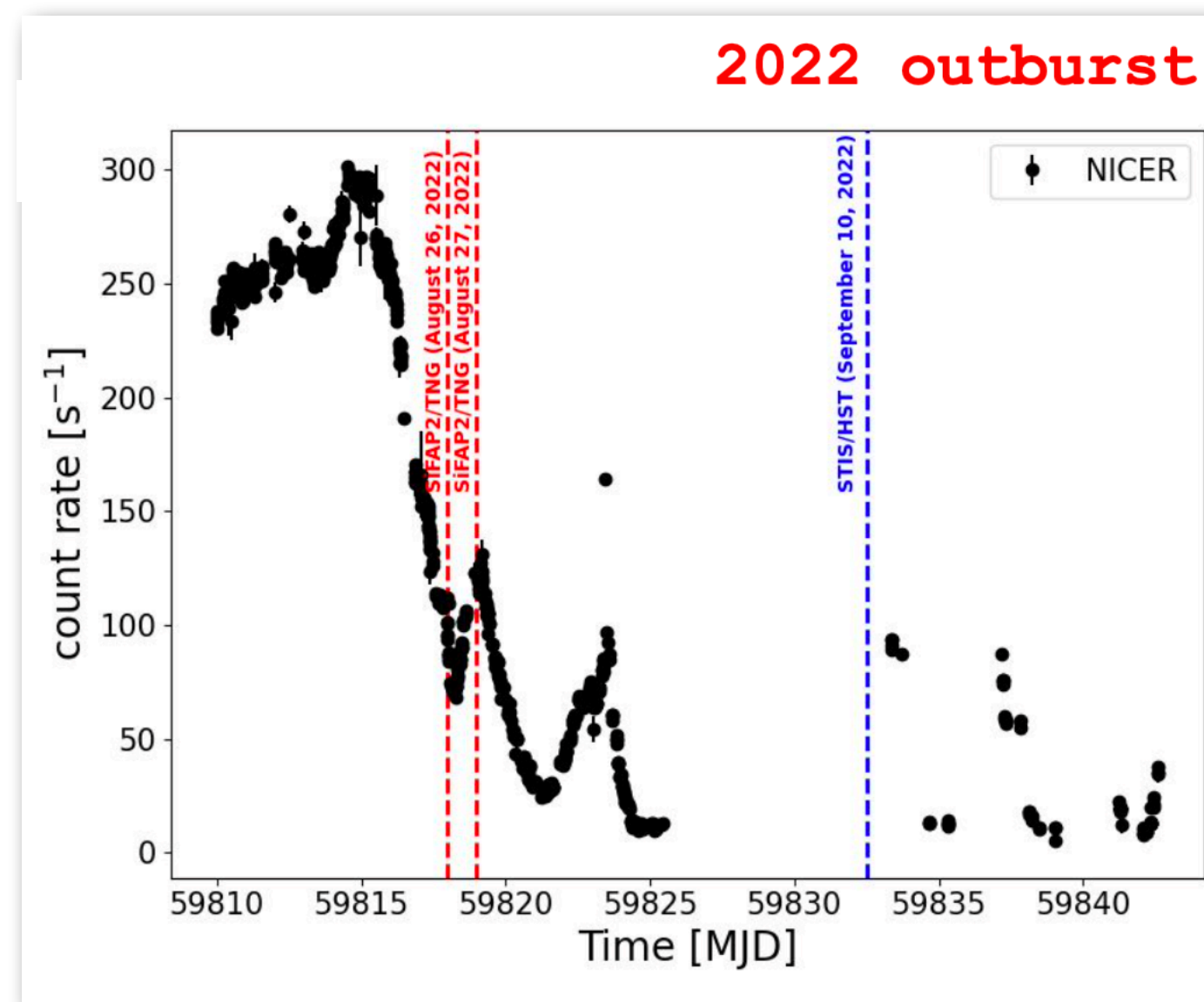
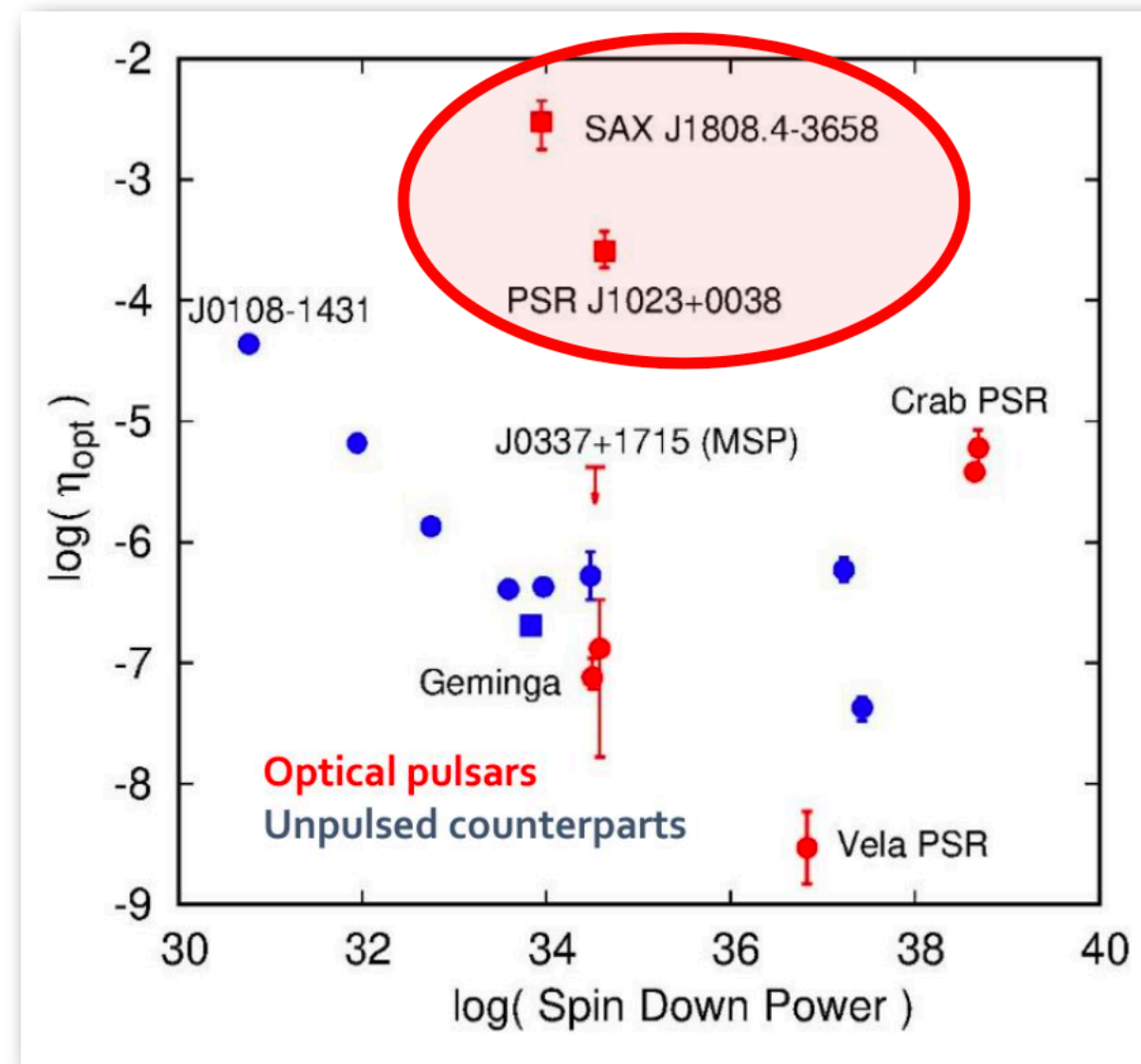
NS binaries

Optical/UV pulsations in AMXP



Ambrosino et al. (2021)

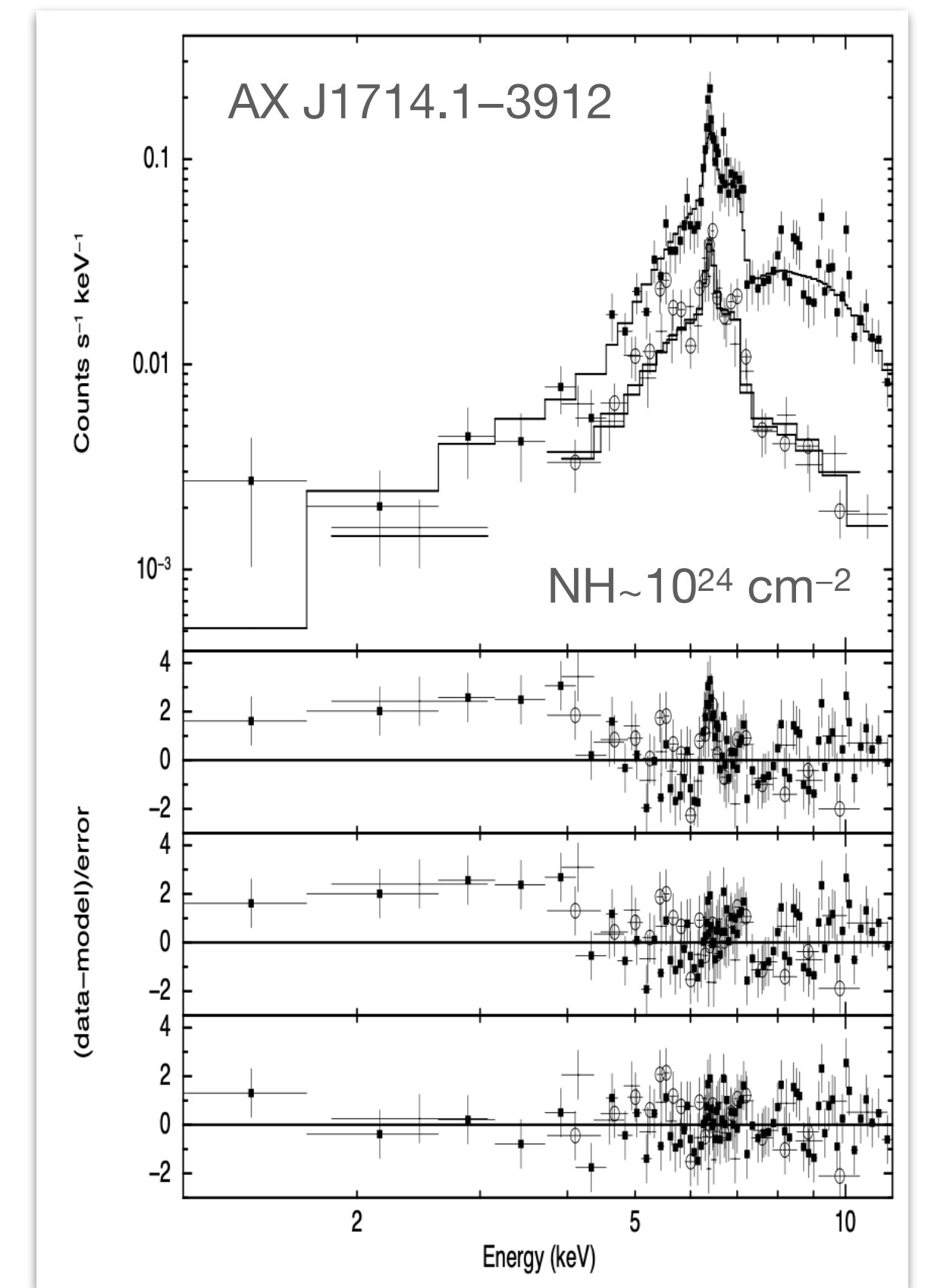
Adapted from Ambrosino et al. (2017)



Illiano et al. (submitted)
 Miraval Zanon et al. (in prep)



SFXT

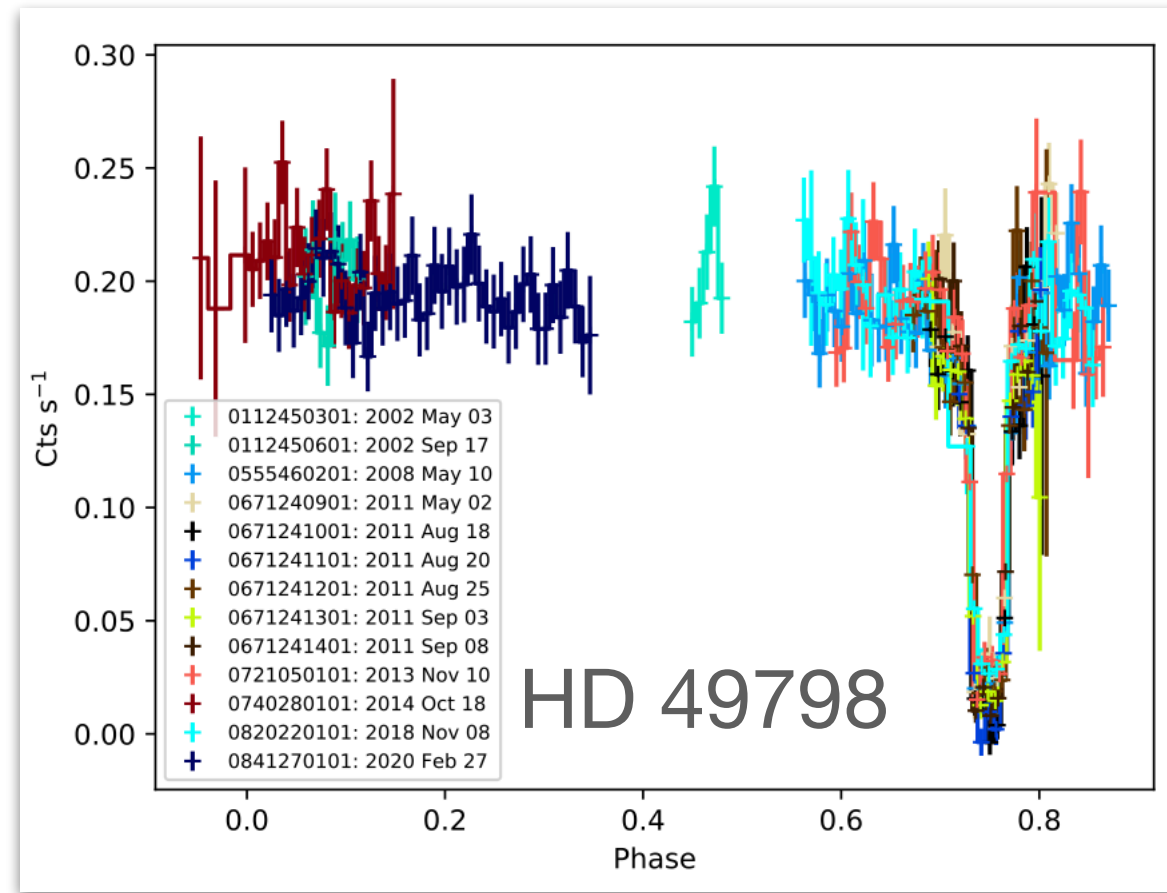


Sidoli et al. (2022)

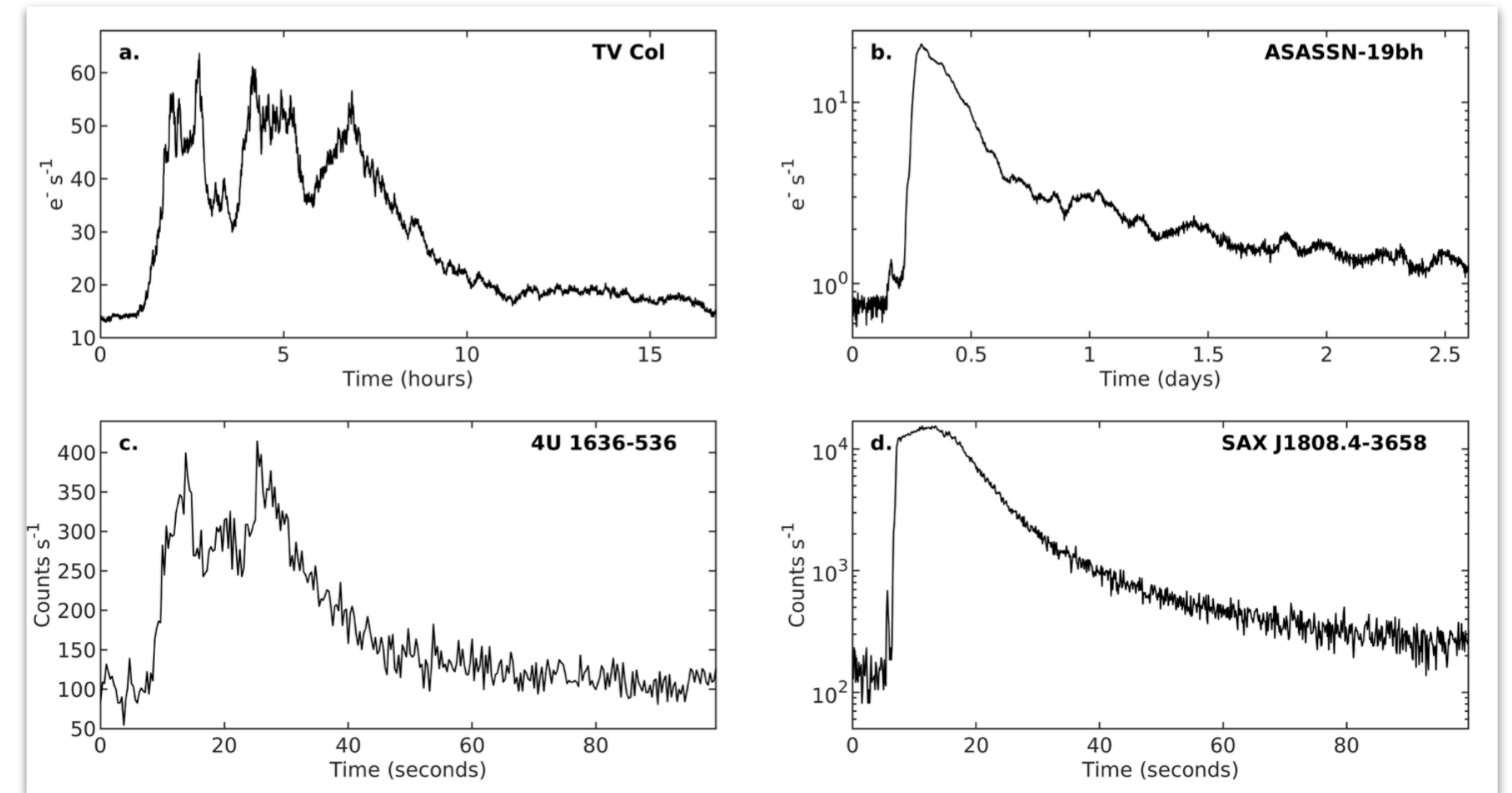
WD binaries



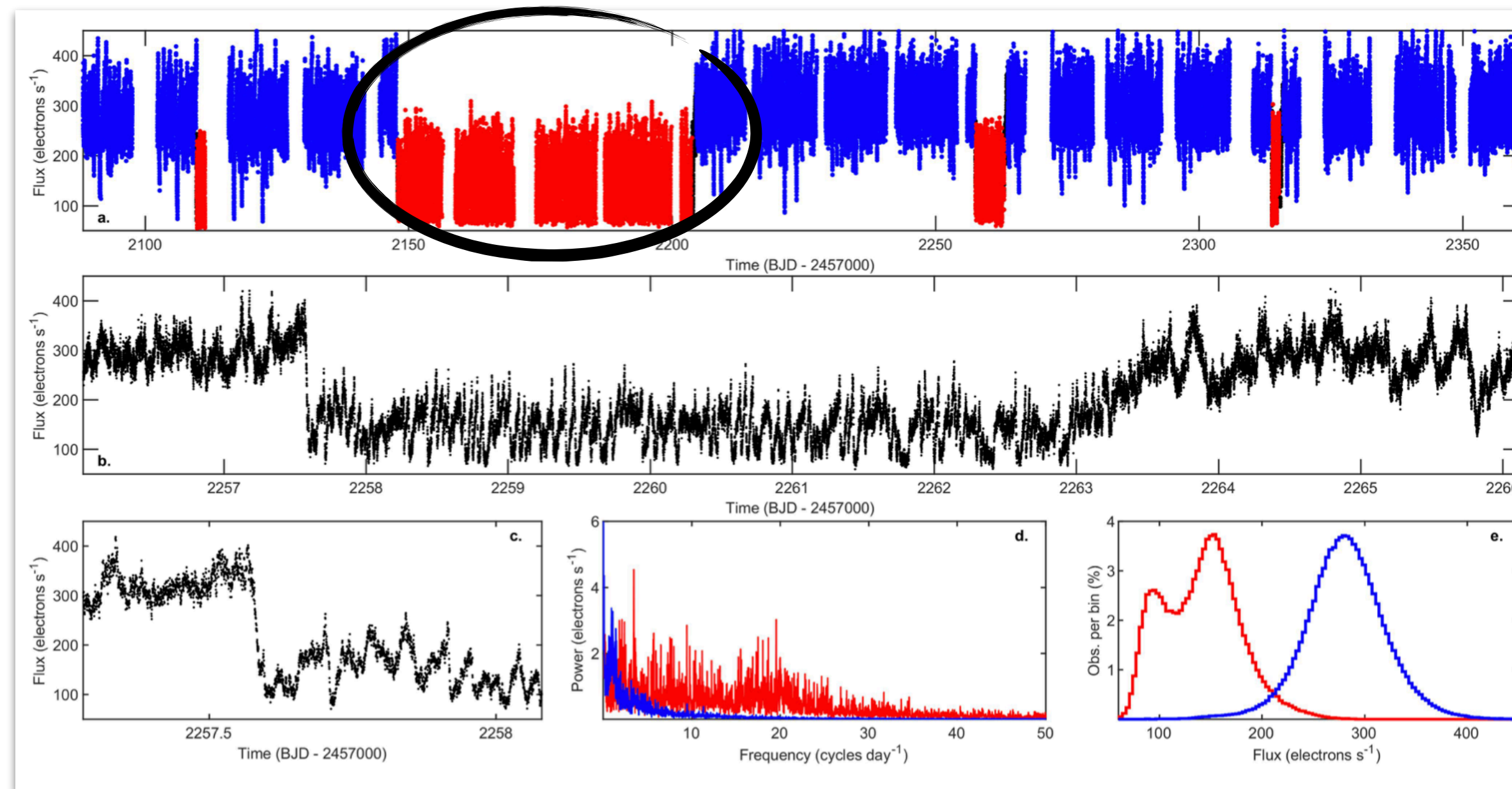
Mereghetti et al. (2021)



X-ray bursts from CVs



Scaringi et al. (2022a)

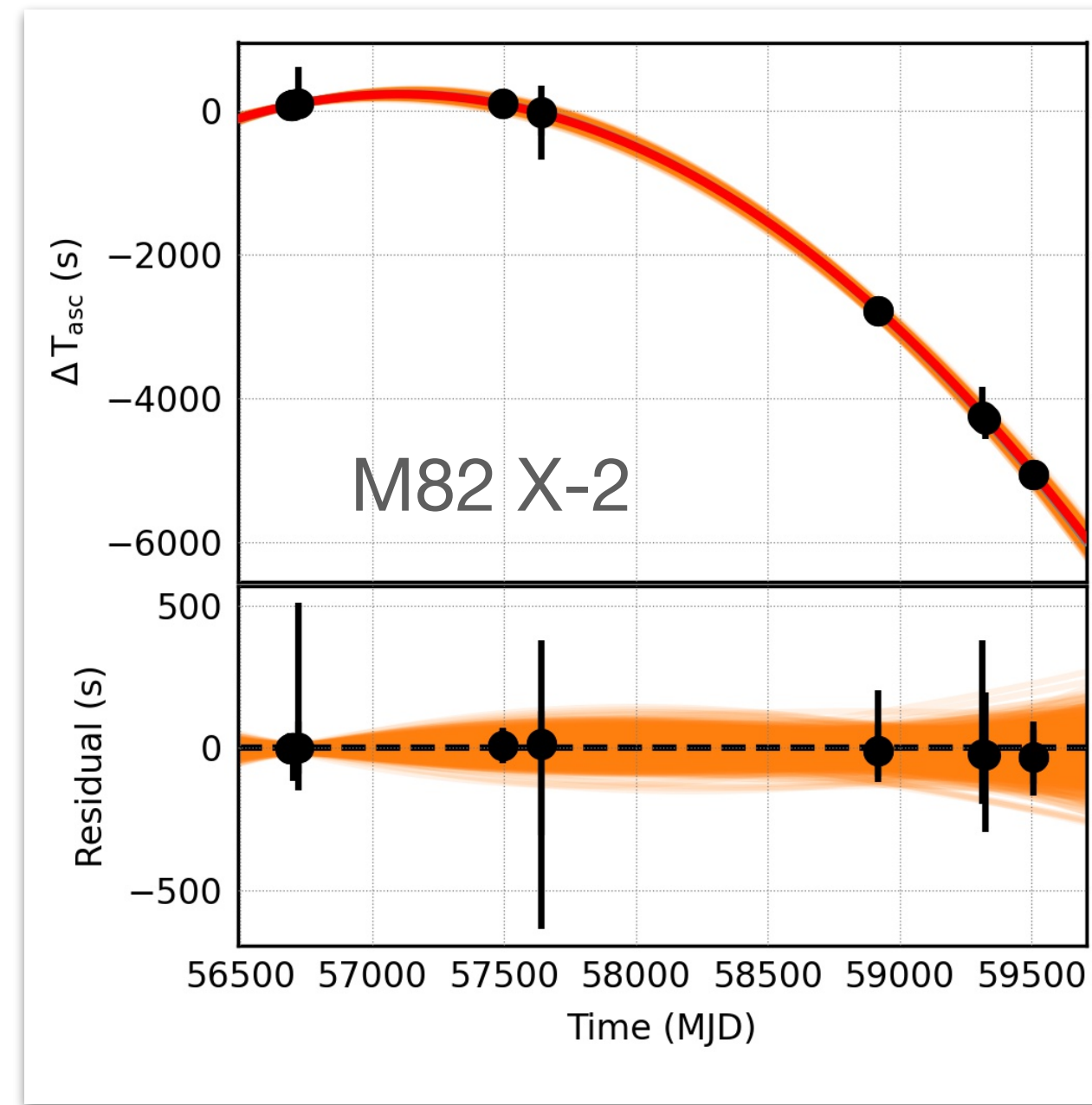


Scaringi et al. (2022b)

ULXs

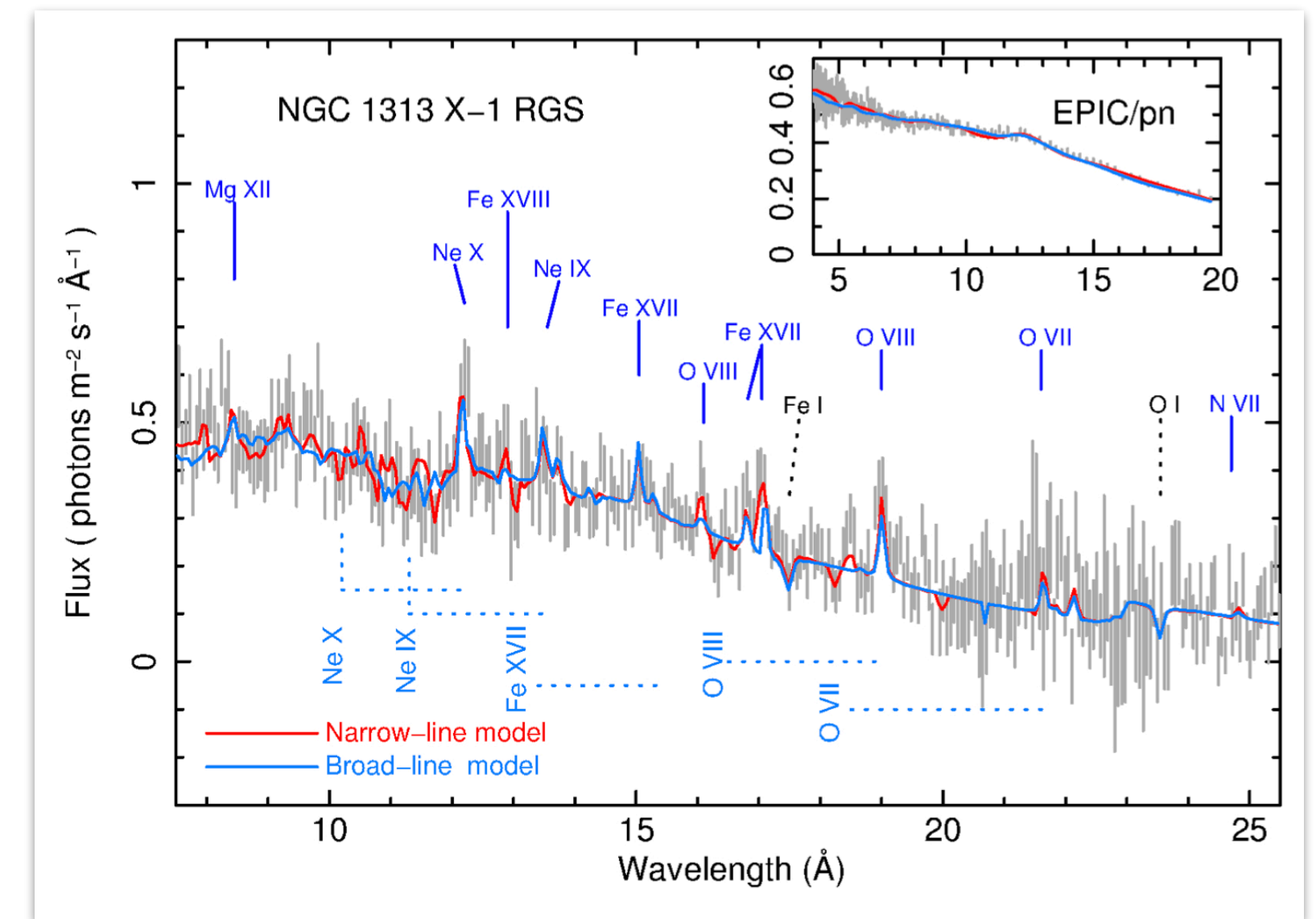


ORBITAL CHANGES



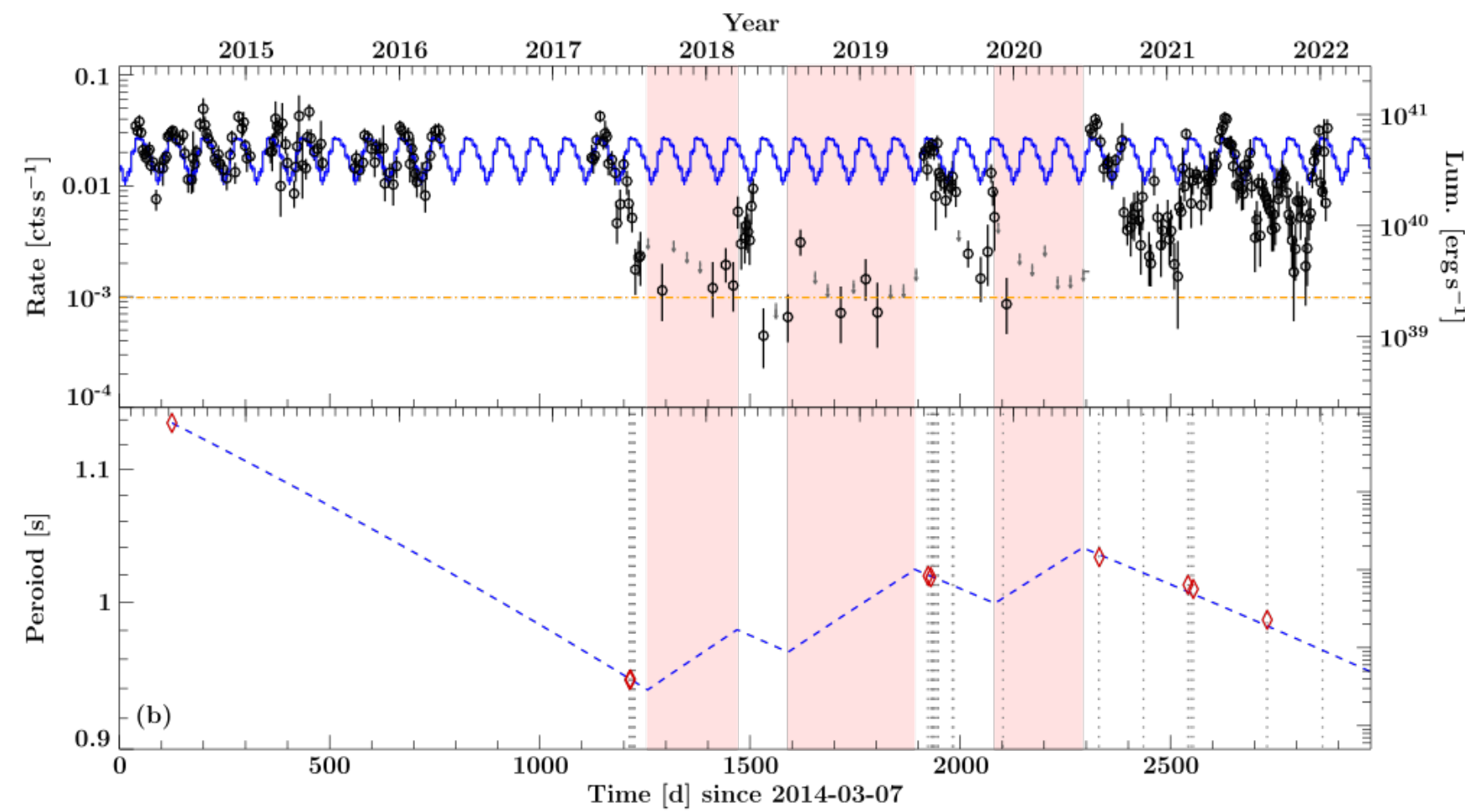
Bachetti et al. (2022)

OUTFLOWS



Pinto et al. (2016)

ACCRETION TRANSITIONS

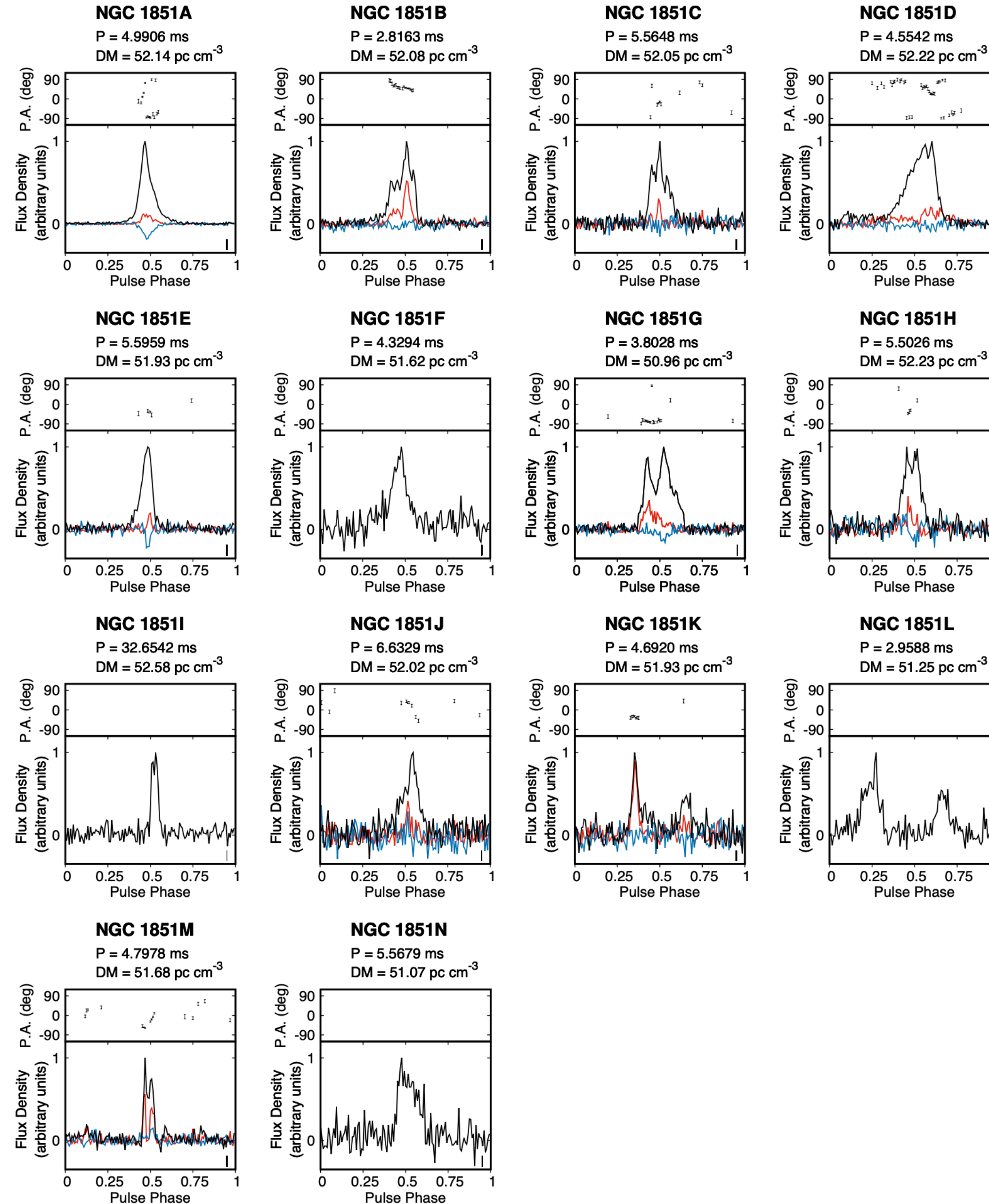


Fuerst et al. (2022, sub.)

Pulsars



TRAPUM Large Survey Project
(Meerkat)

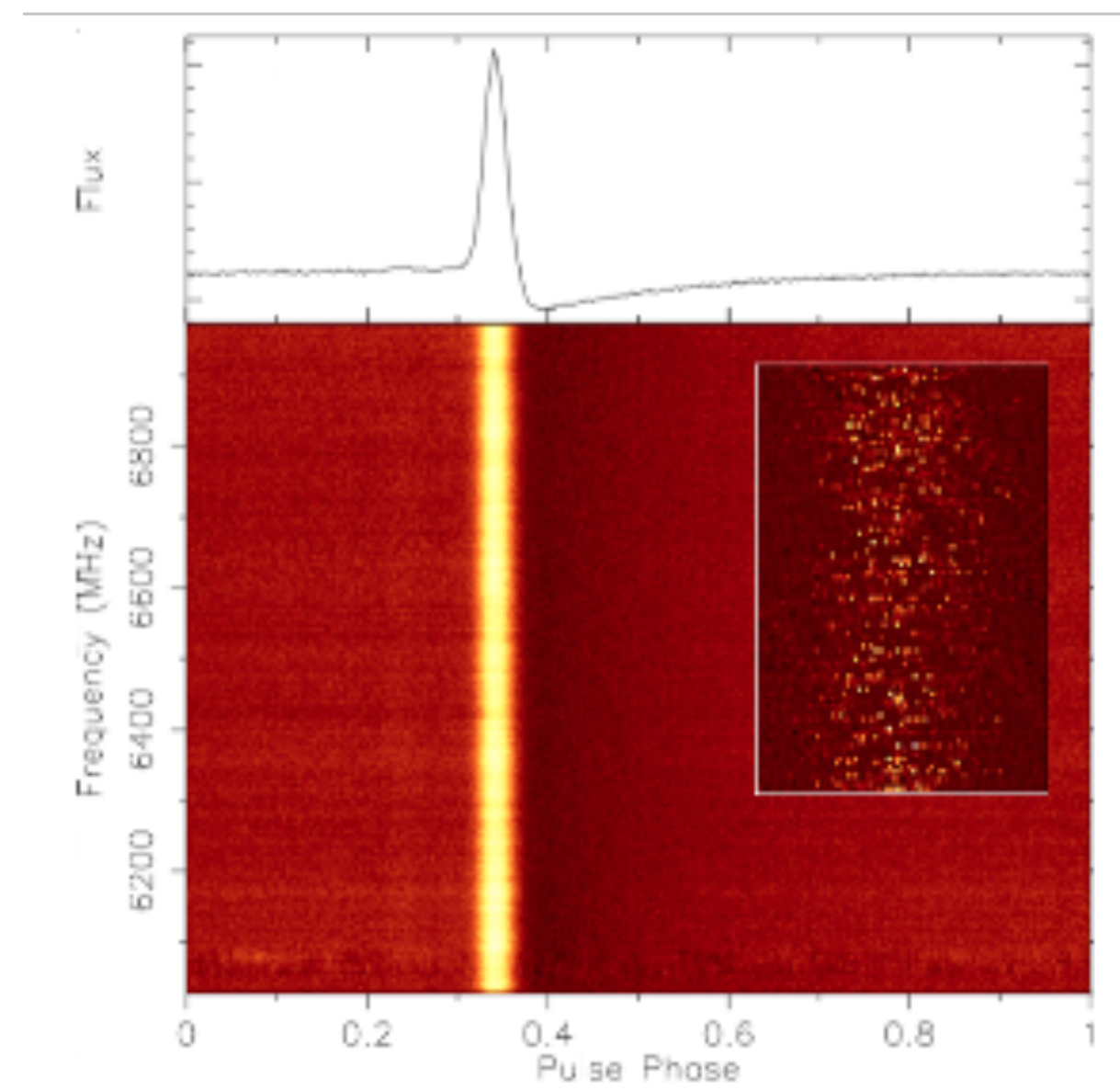
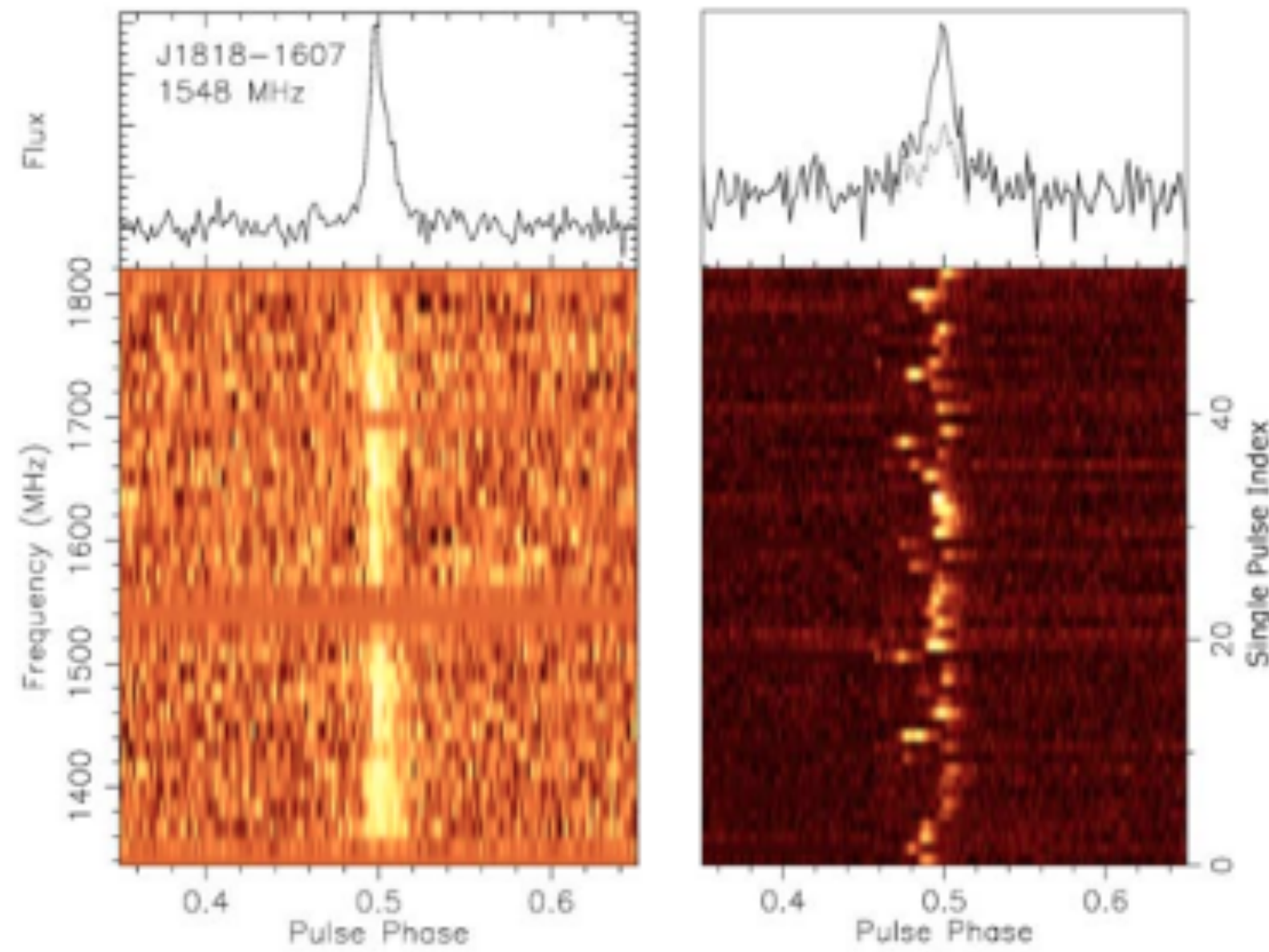


Magnetars



Swift J1818.0-1607

XTE J1810-197



LARGE MULTI- λ CAMPAIGNS

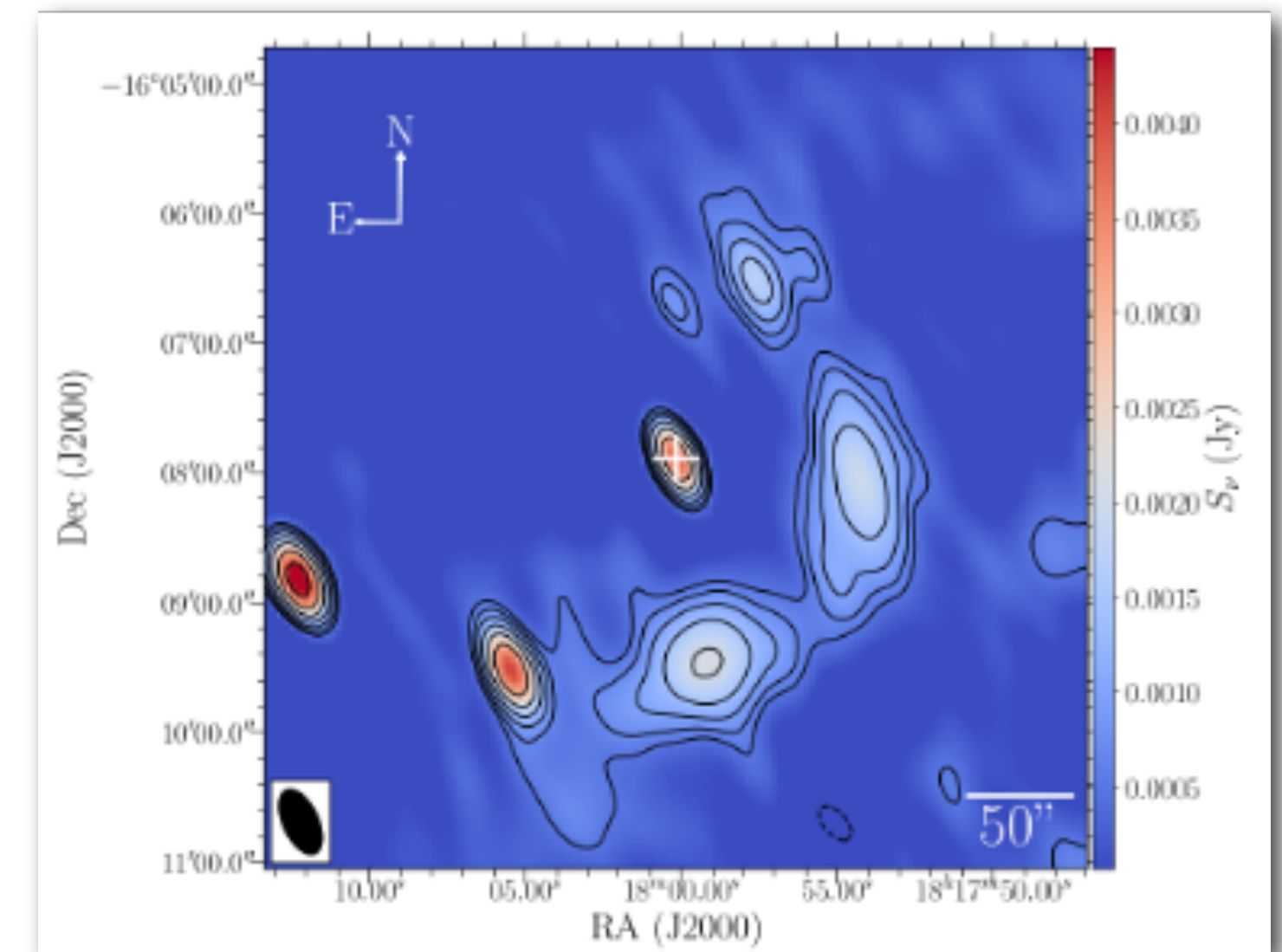
~ 2-3 campaigns/yr, ~1 new magnetar/yr
Data from radio up to TeV energies

Youngest known NS (500 yr)

Esposito et al. (2020)

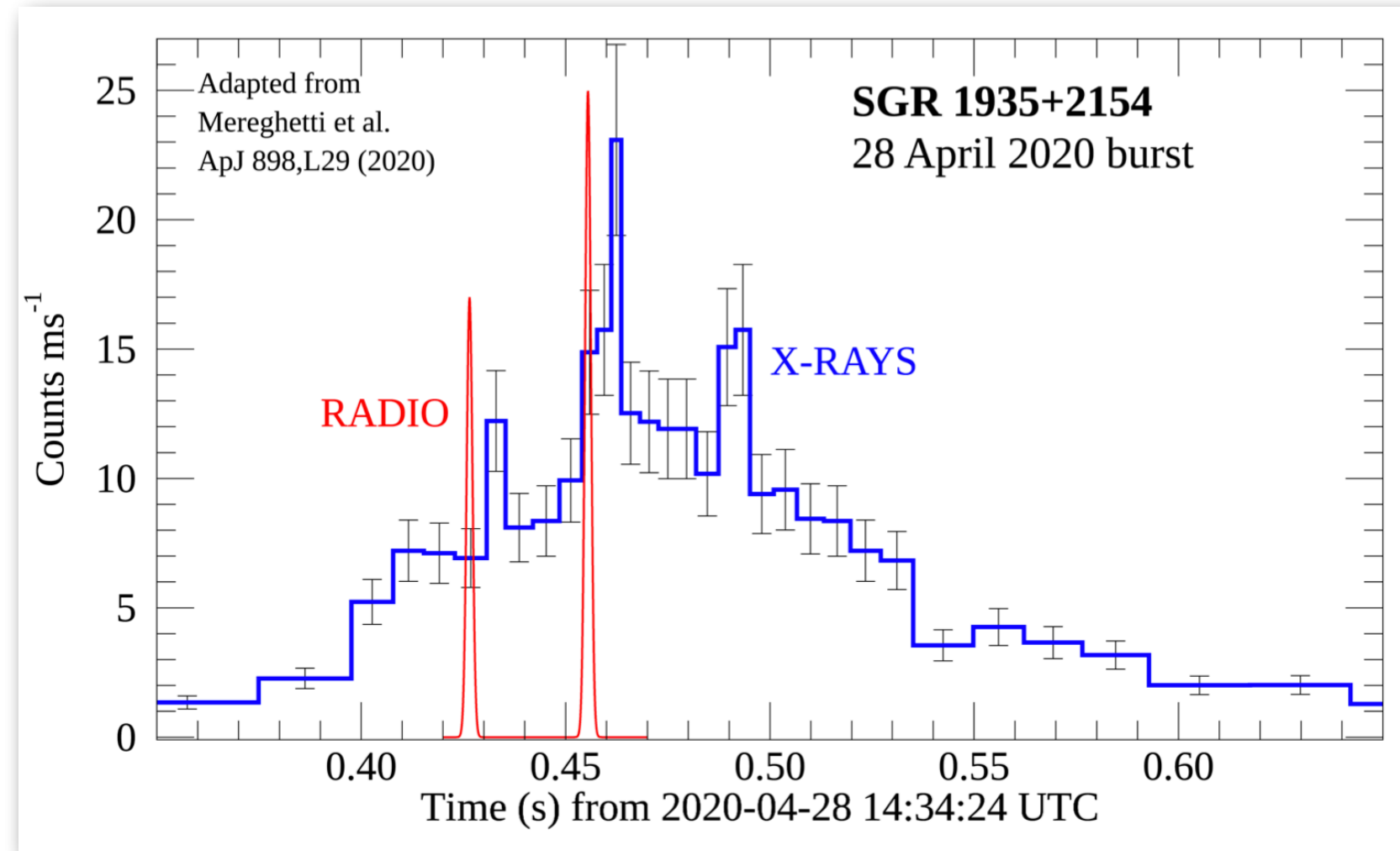
First radio-loud magnetar

Borghese et al. (2020)

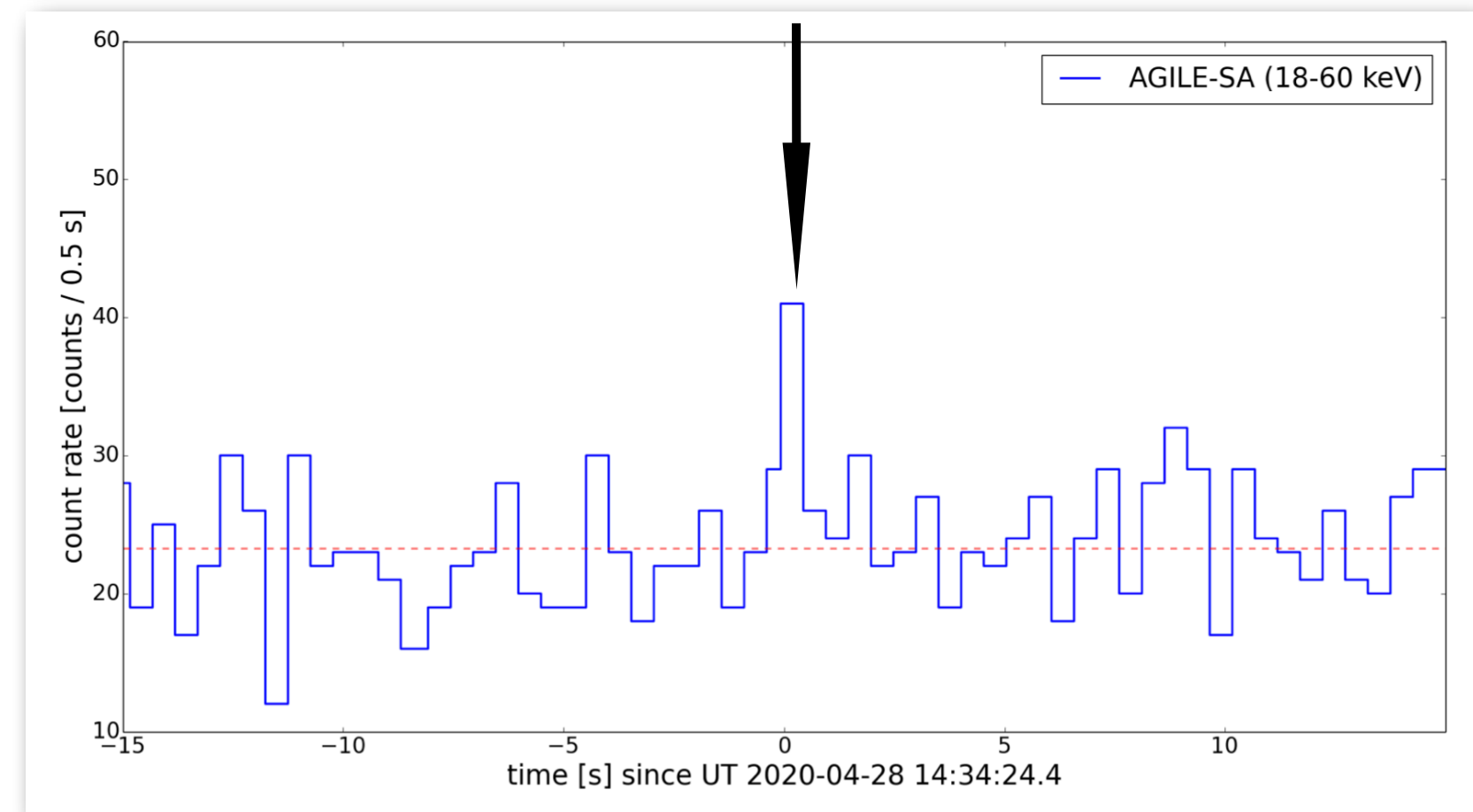


Ibrahim et al. (subm.)

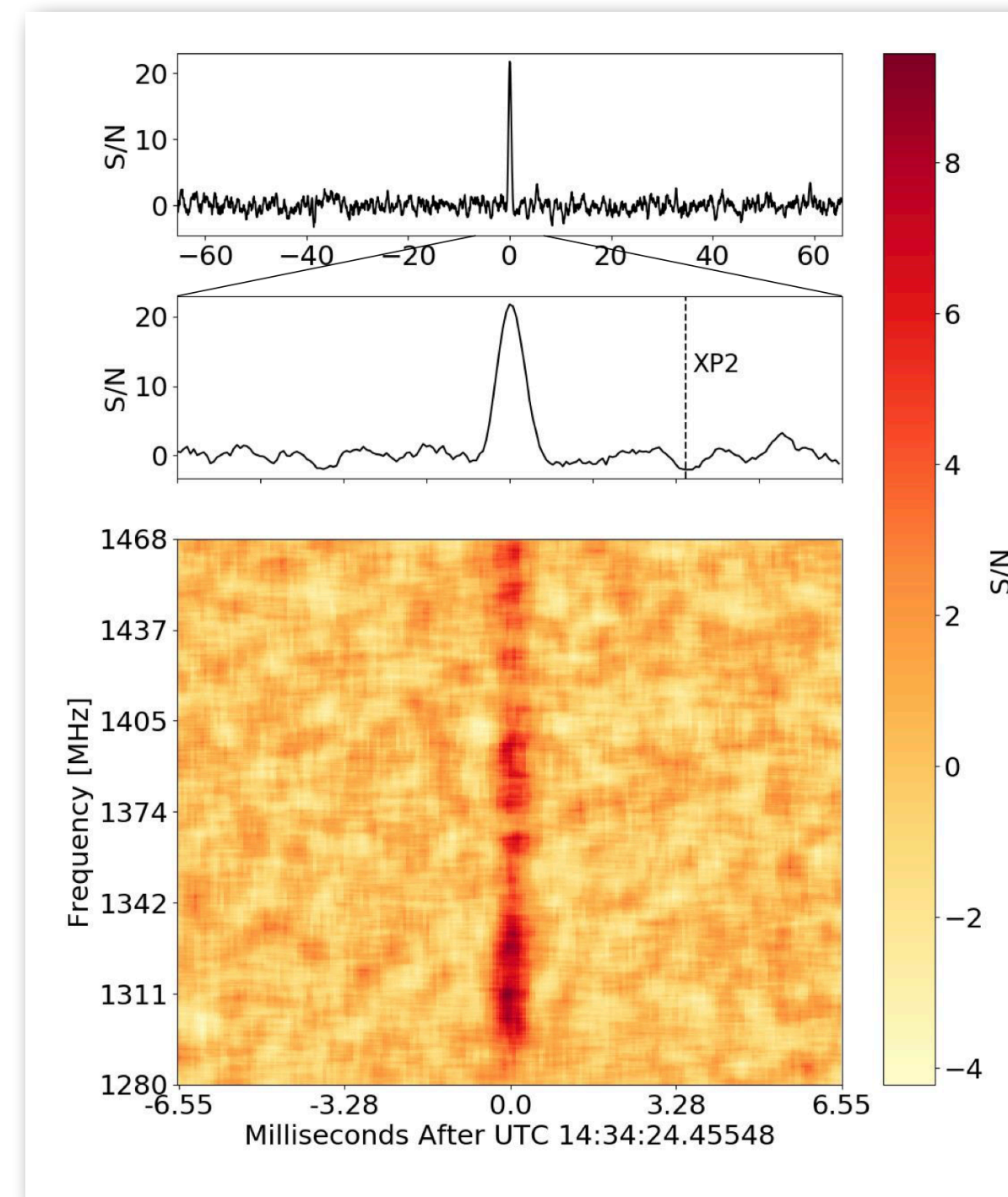
Fast Radio Bursts



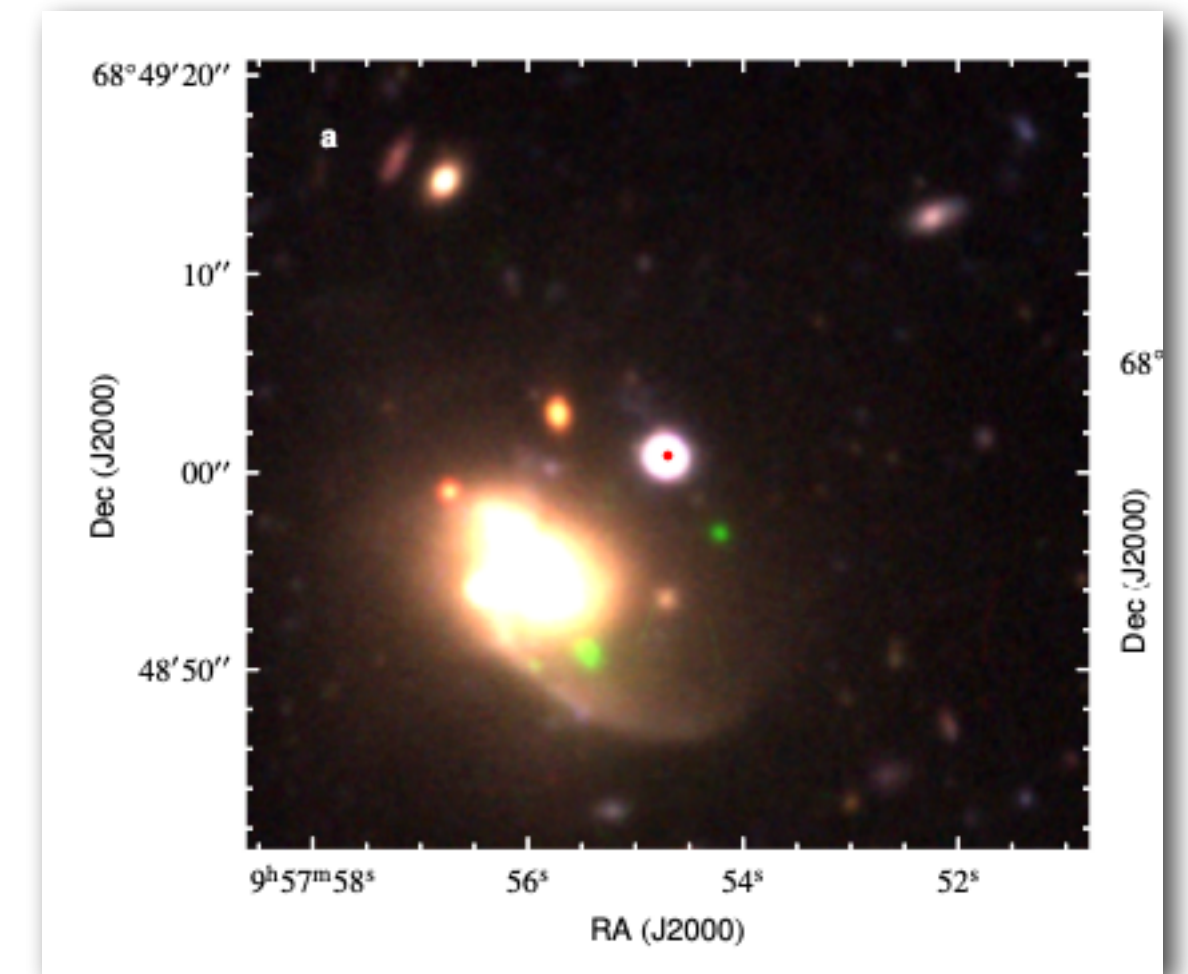
Mereghetti et al. (2020)



Tavani et al. (2021)



Bochenek et al. (2020)



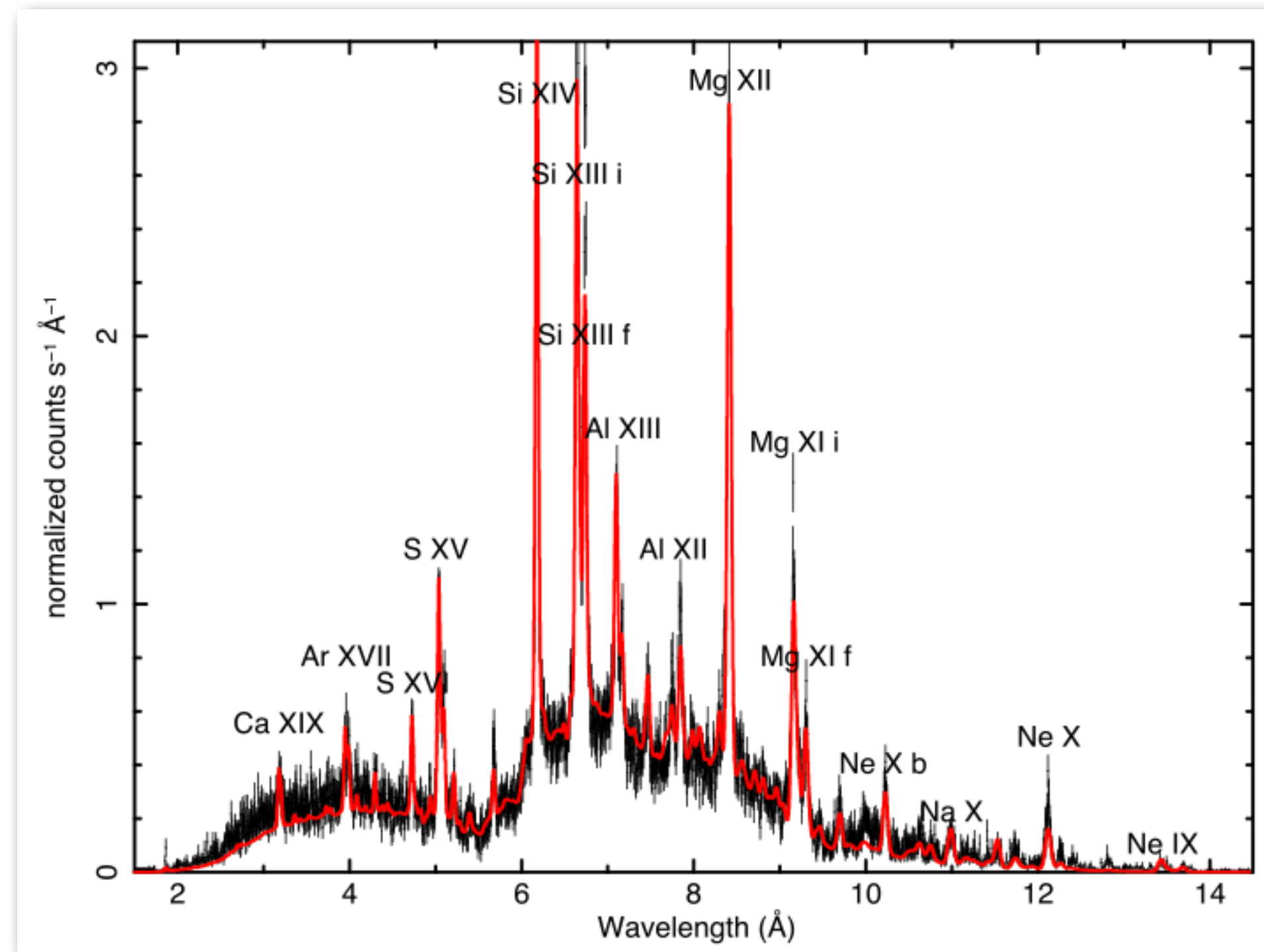
Kirsten et al. (2022)

FRBs \iff Magnetars?

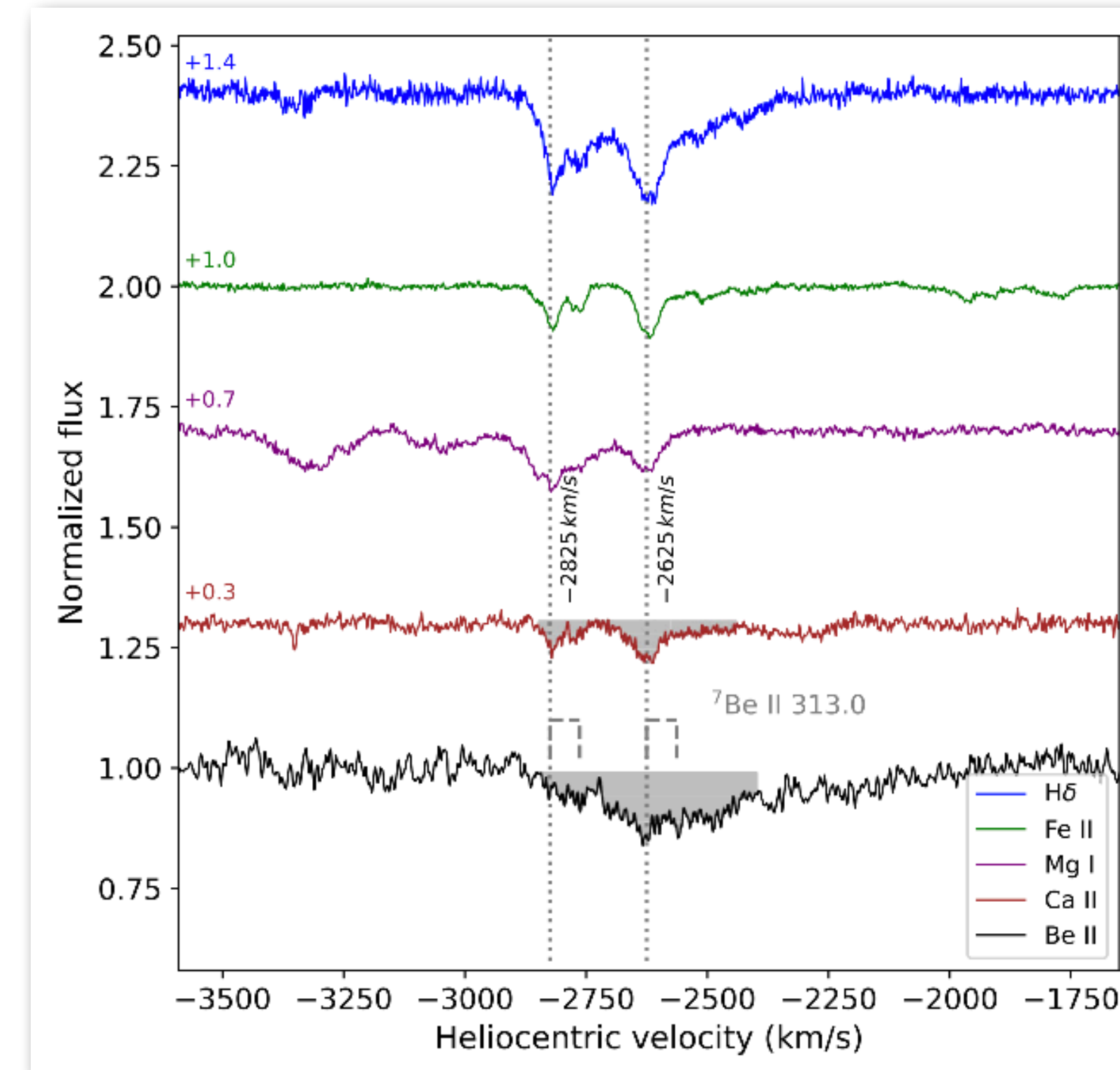
Novae

Shocks in RS Oph

^7Be II lines



Orio et al. (2022)



Molaro et al. (2022)

Summary and perspectives

- Very strong activity
- BH work lacks critical mass
- Funding appears limited
- Mini-grants?
- Strong connection to missions/
infrastructures
- Accretion geometry and properties,
fundamental physics (later),
magnetospheres, nature of FRBs,
ULX conundrum

