

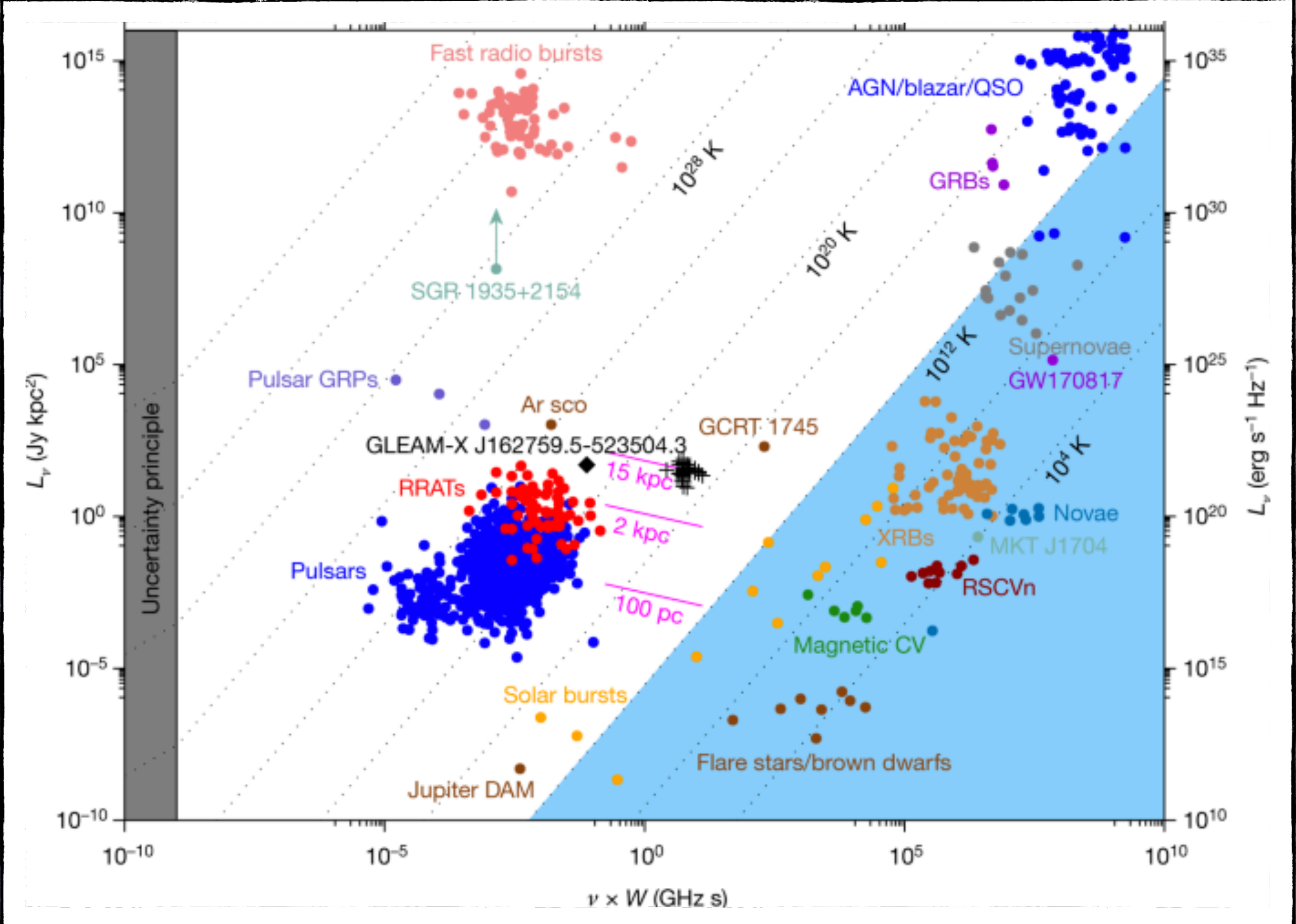
# Fast Radio Bursts in the SKA era

Maura Pilia



# The transients phase space

Originally from Pietka, Fender & Keane 2015, MNRAS



Evan Keane: «If only I had a dime for every time one of you has used this diagram!»

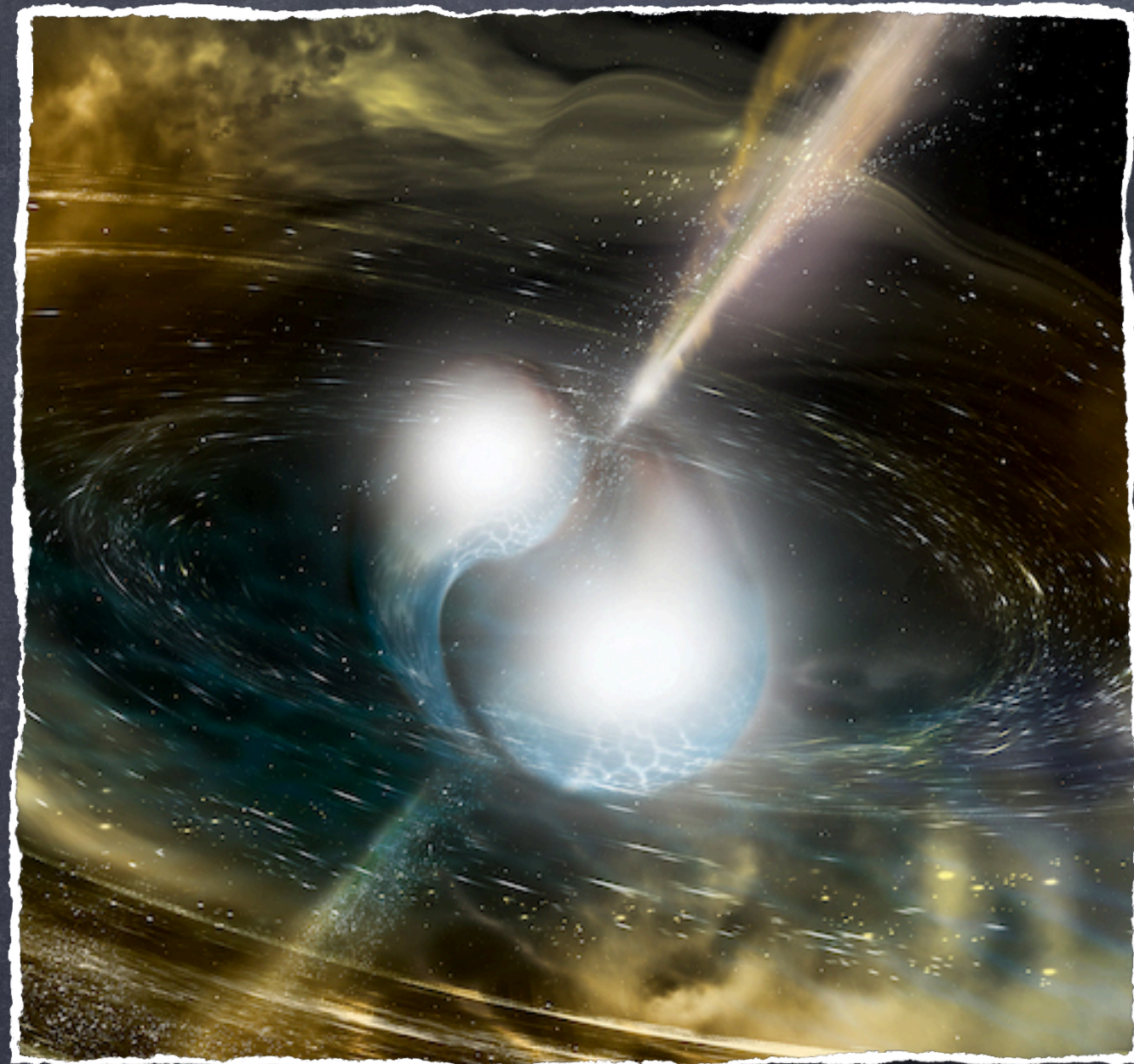


FRB Zoo



# FRB Zoo

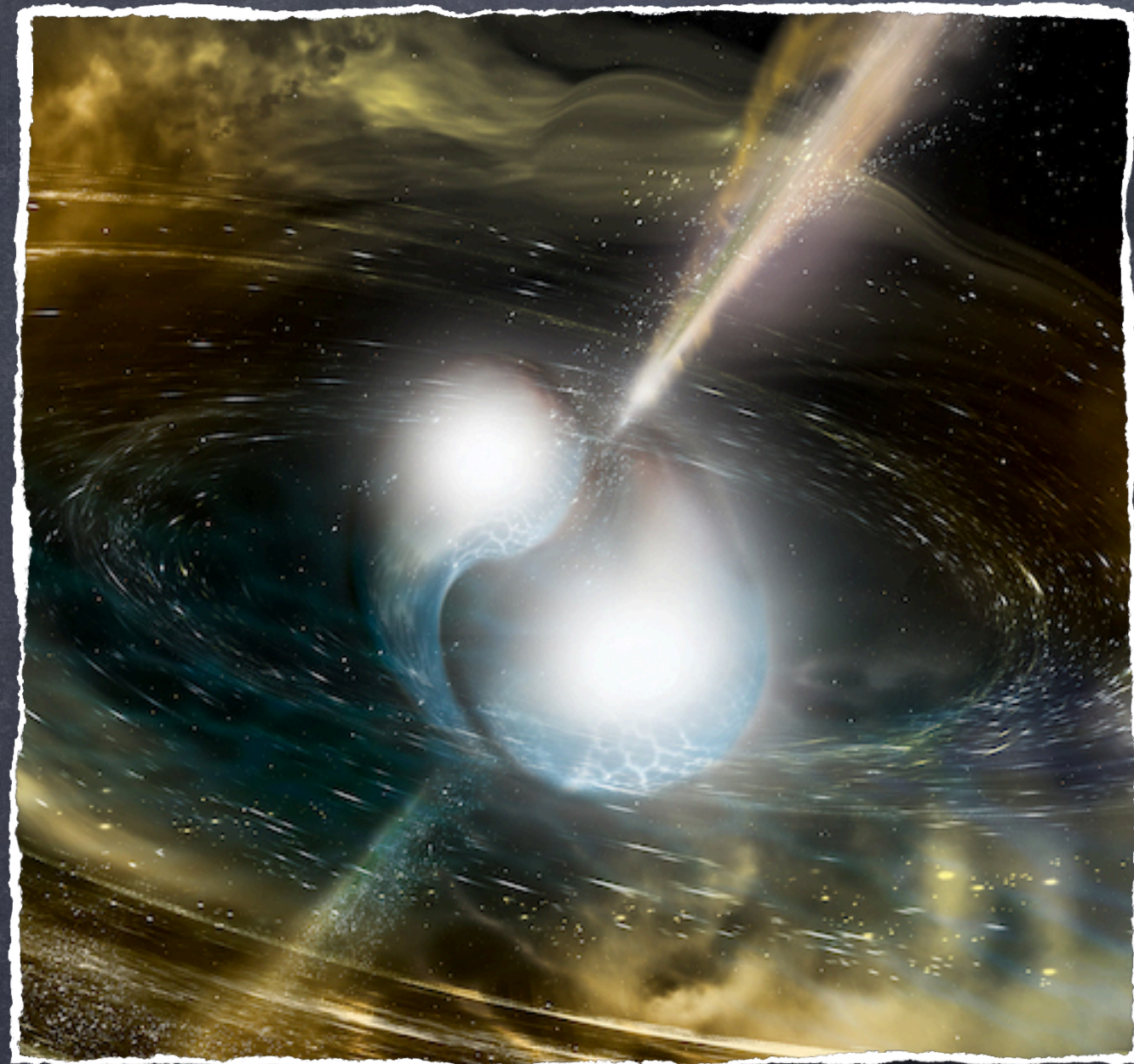
756 FRBs





# FRB Zoo

756 FRBs



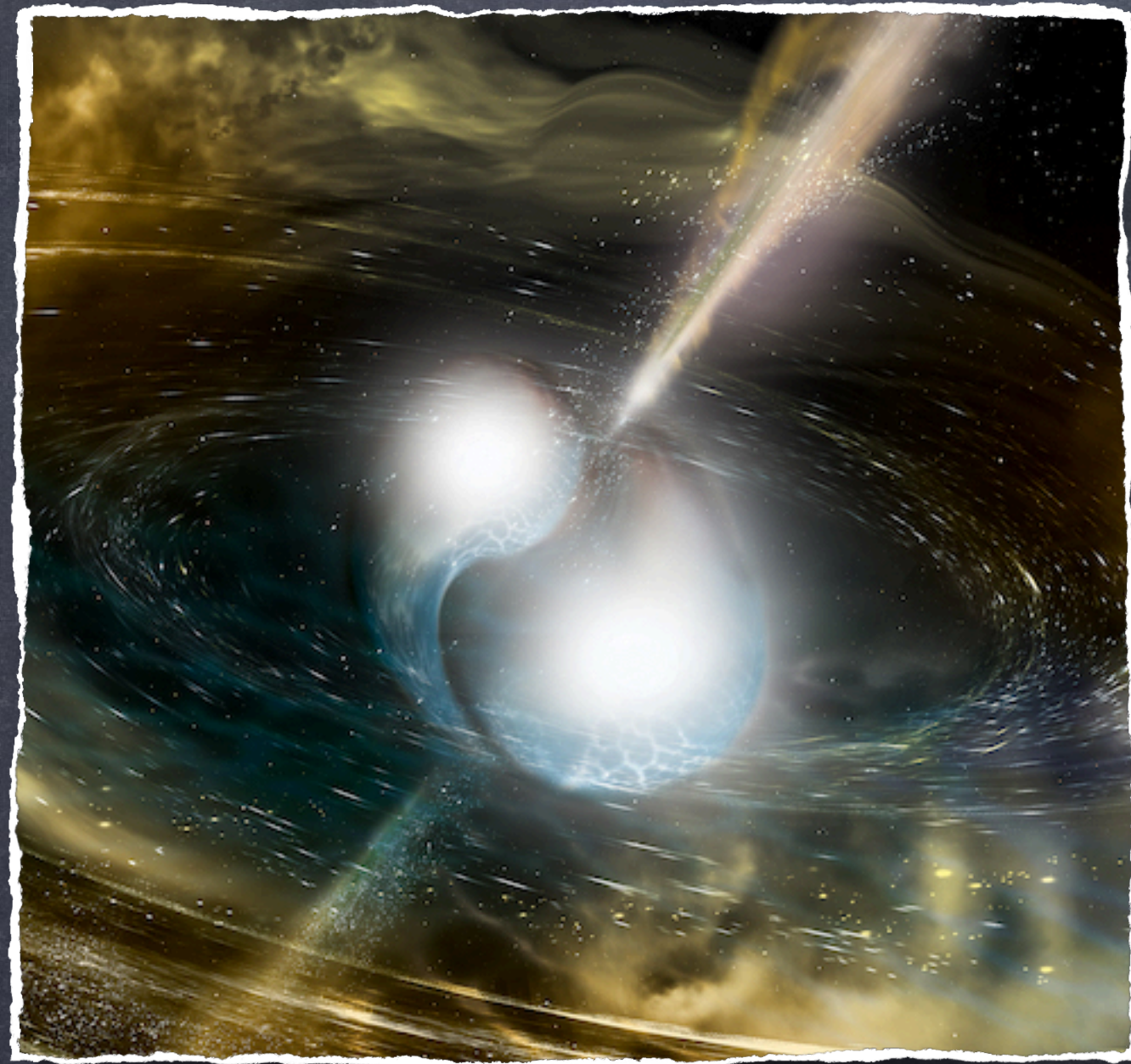
51 repeaters



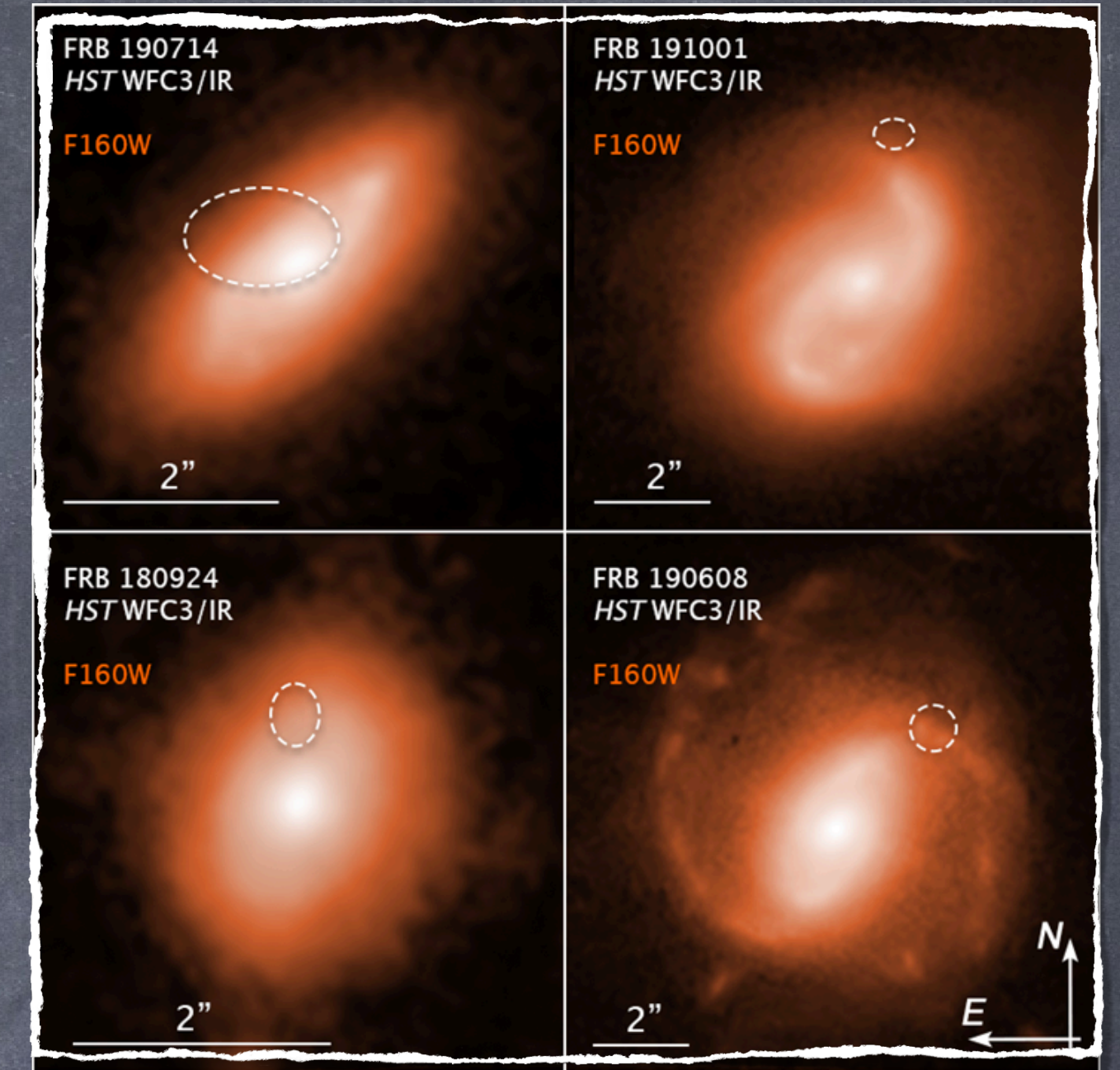
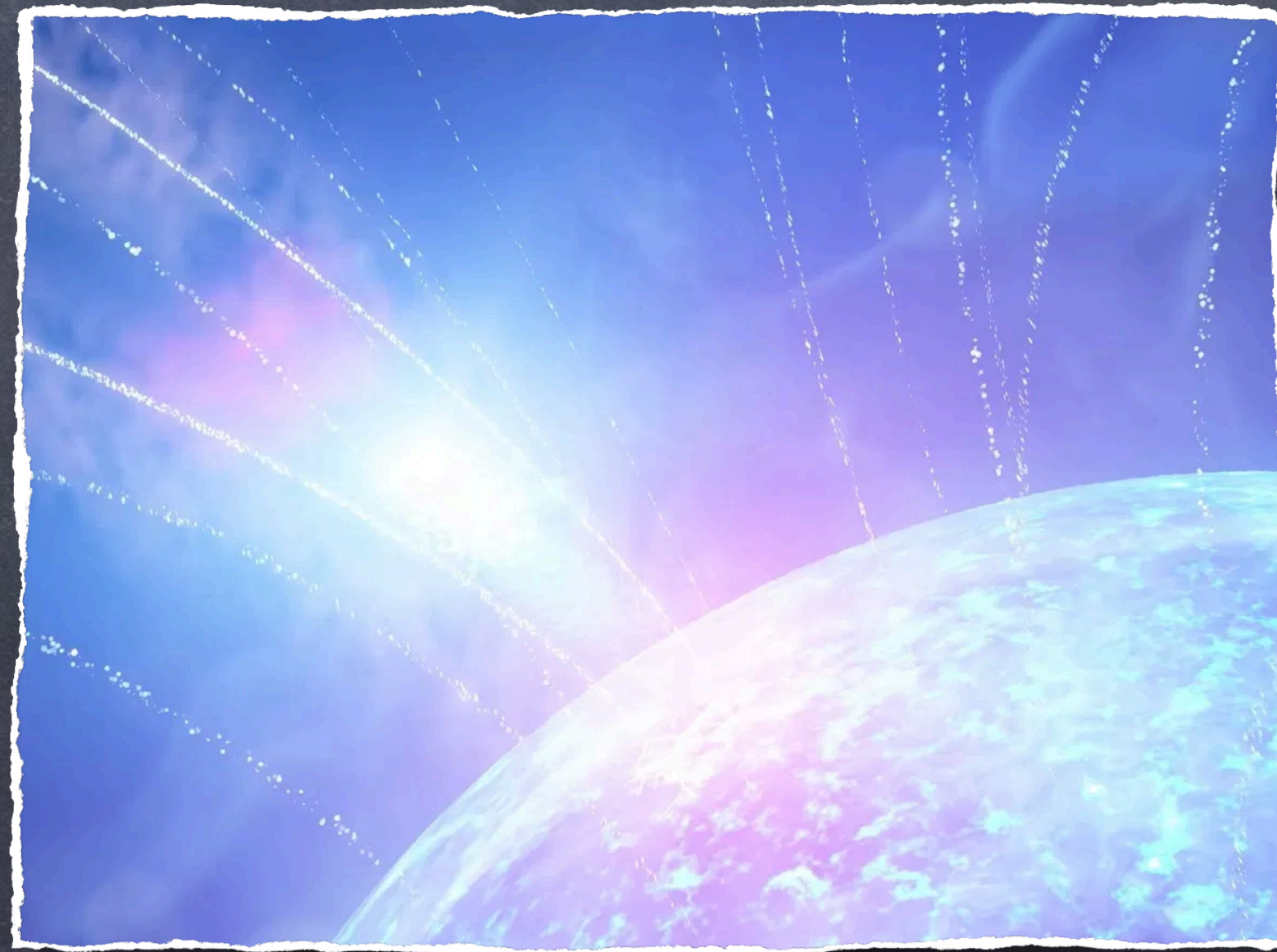


# FRB Zoo

756 FRBs



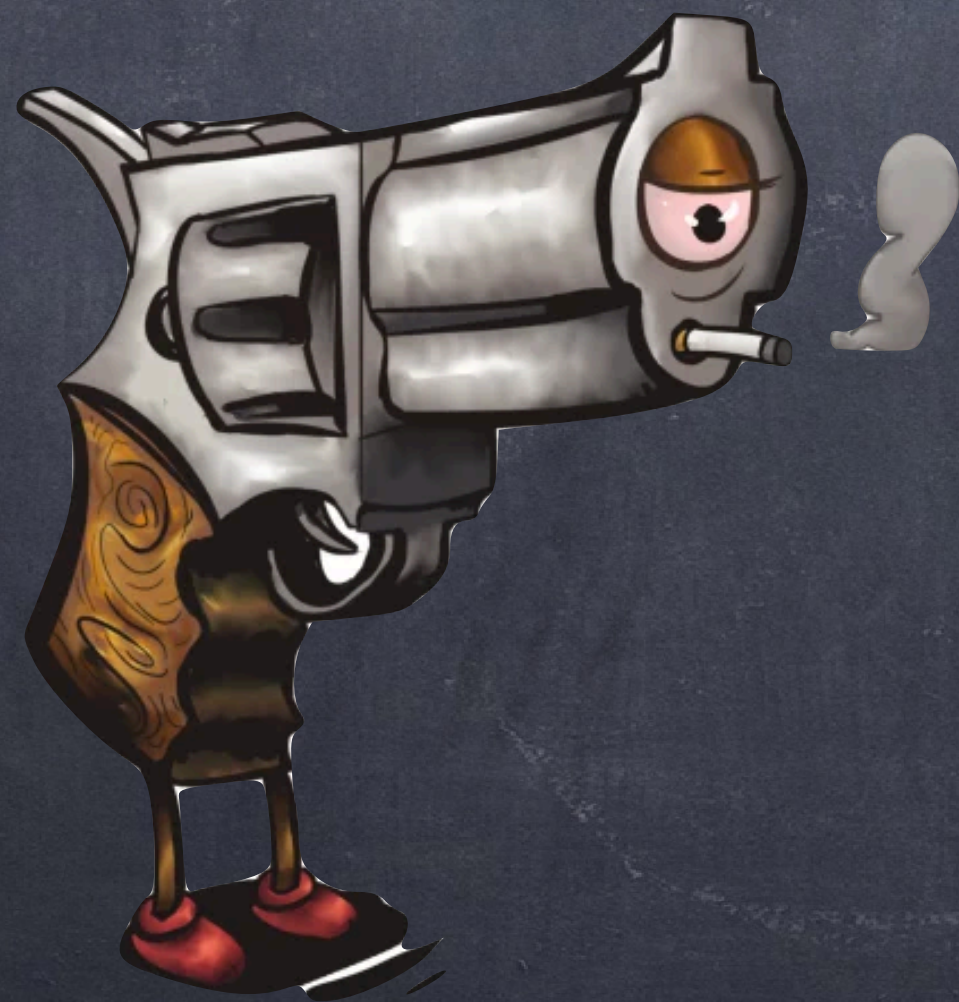
51 repeaters



43 host galaxies

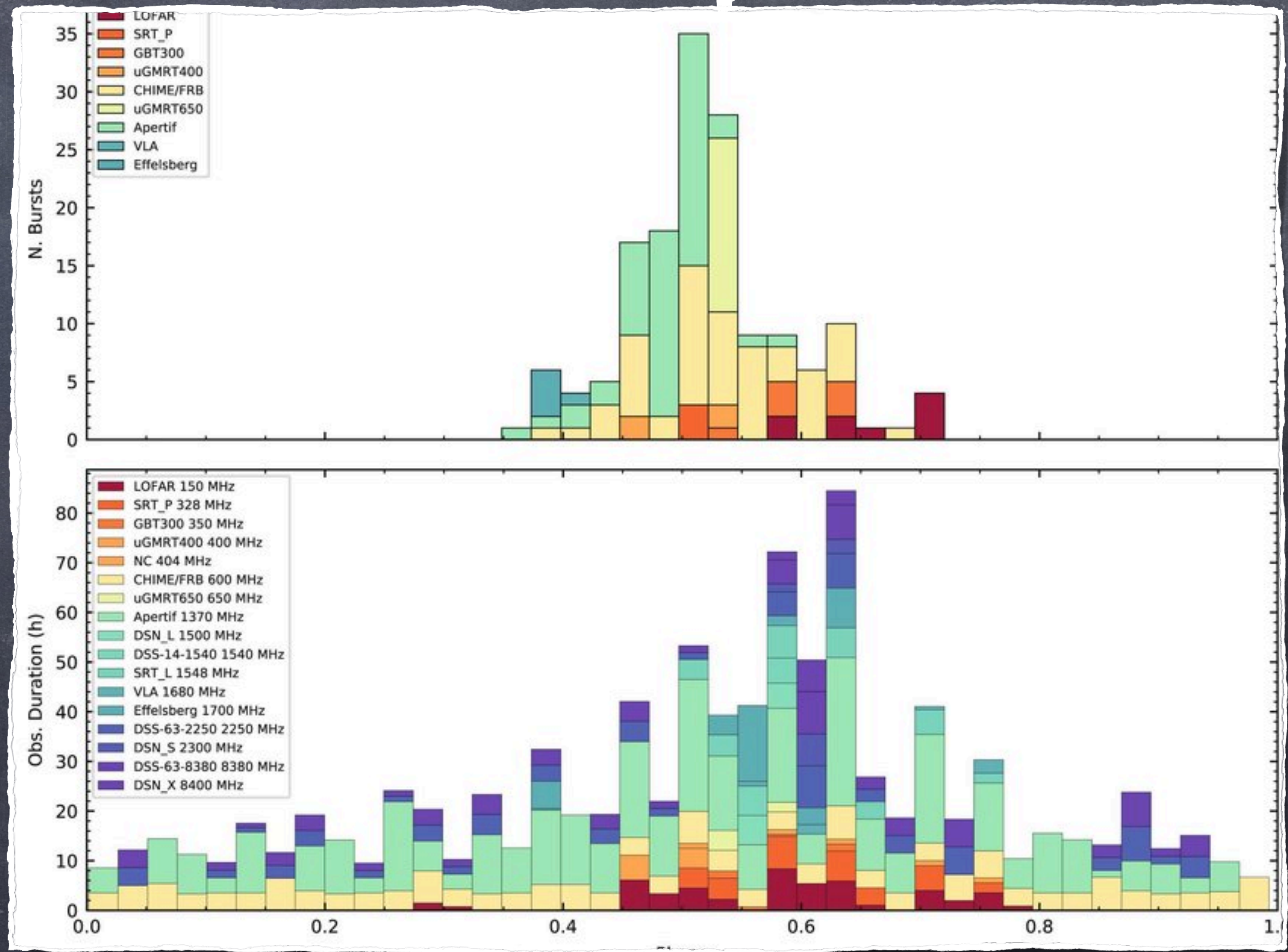


# 2020: A blessed year for FRBs





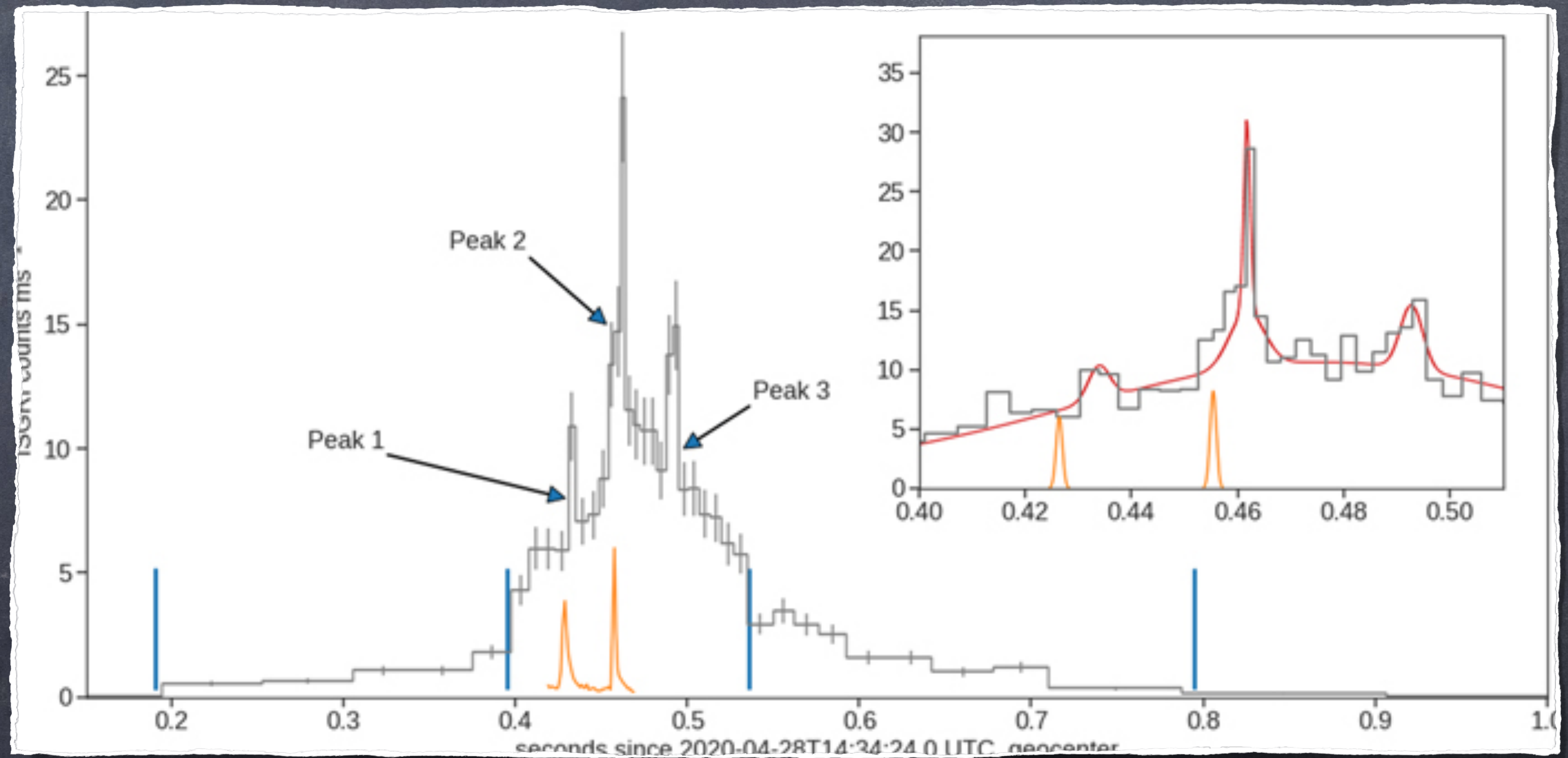
# 2020: A periodic repeater





2020:

A galactic magnetar emitting  
an FRB-like signal

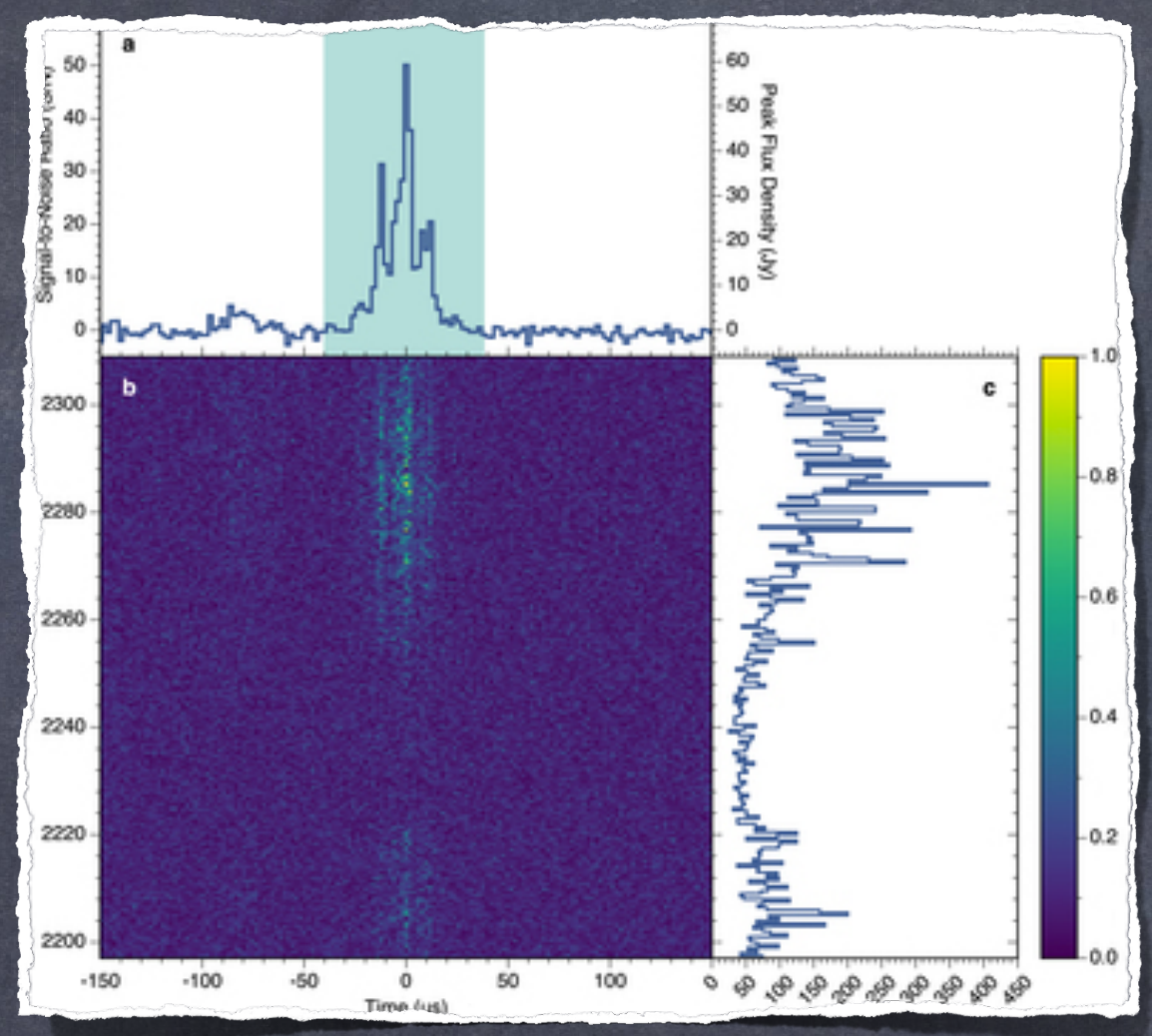


CHIME/FRB Coll. 2020a, Nature; Bochenek et al. 2020, Nature; Mereghetti et al. 2020, ApJL; Tavani et al. 2020, NatAstro; Li et al. 2020, NatAstro; Ridnaia et al. 2020, NatAstro

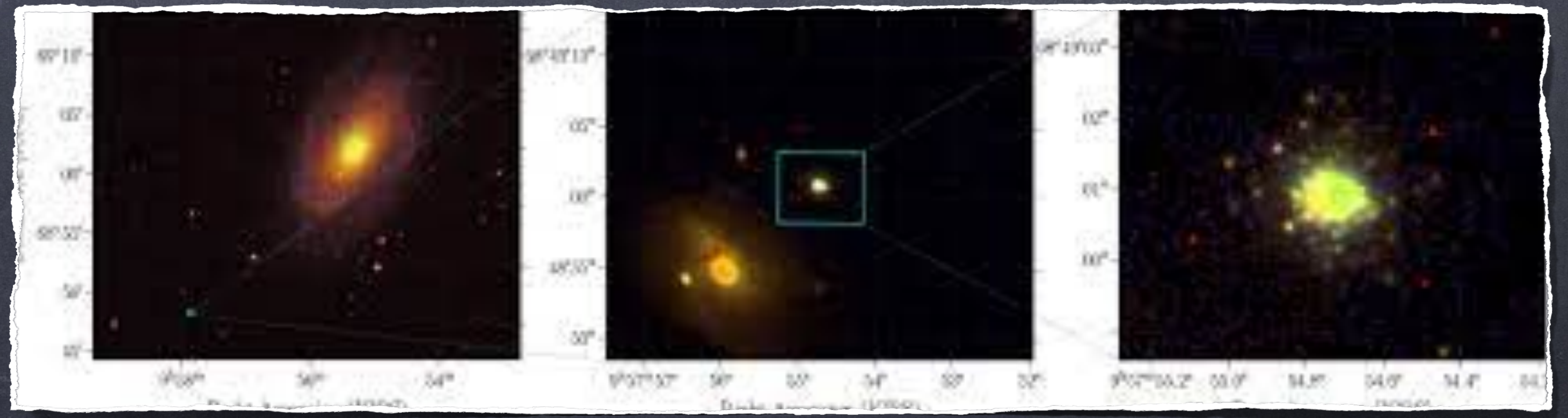


2020:

# An FRB from a globular cluster

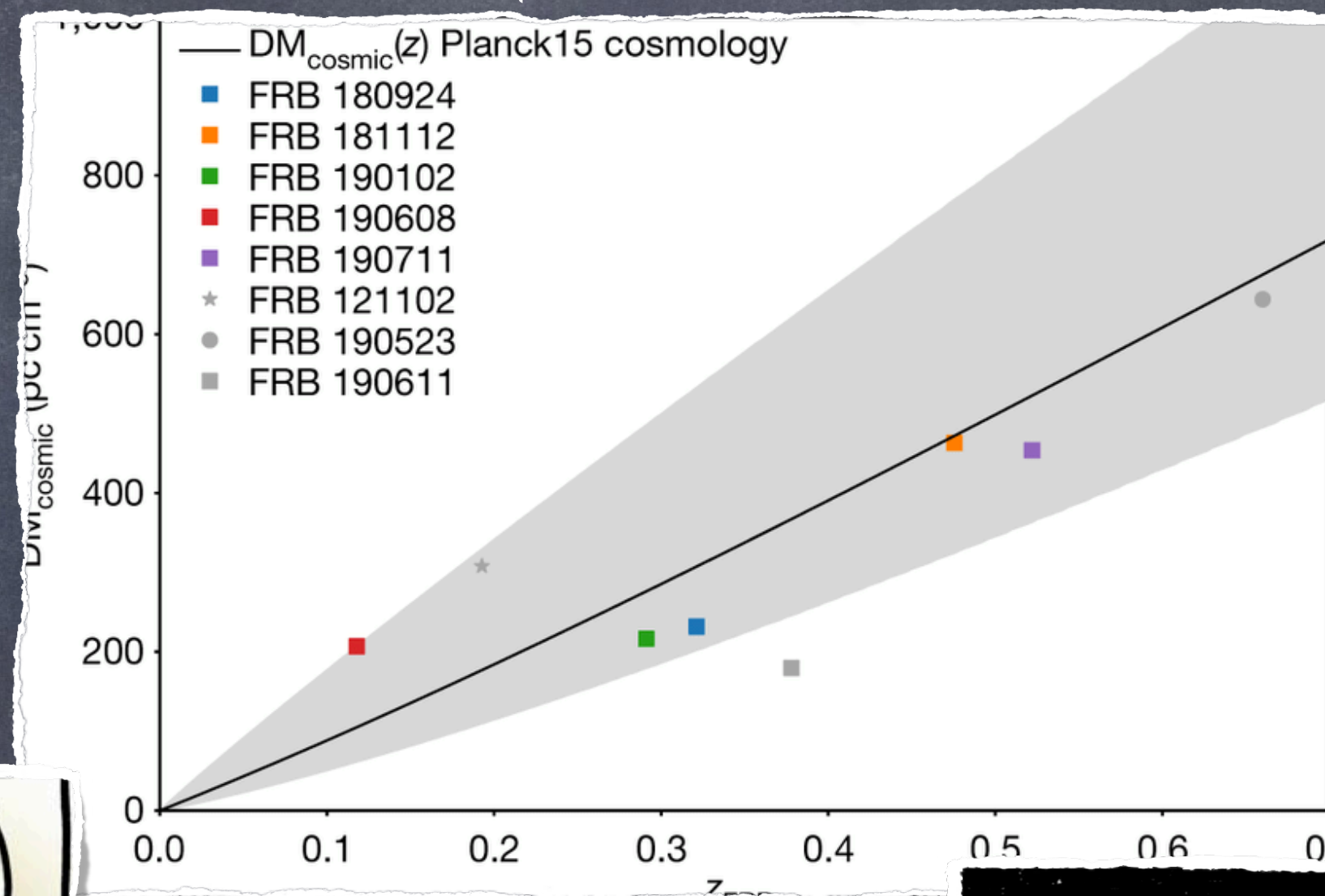


Bhardwaj et al. 2021, ApJL  
Kirsten et al. 2022, Nature

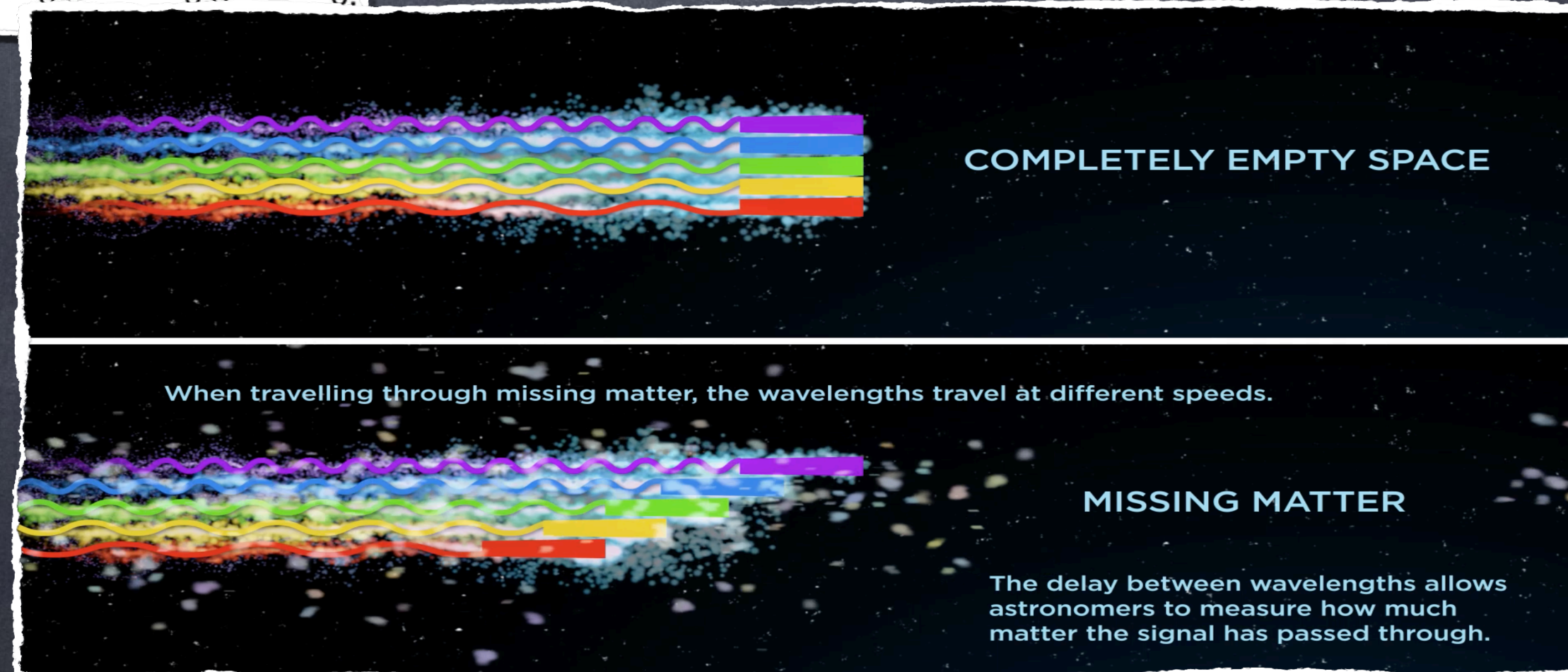




# 2020: A blessed year for FRBs

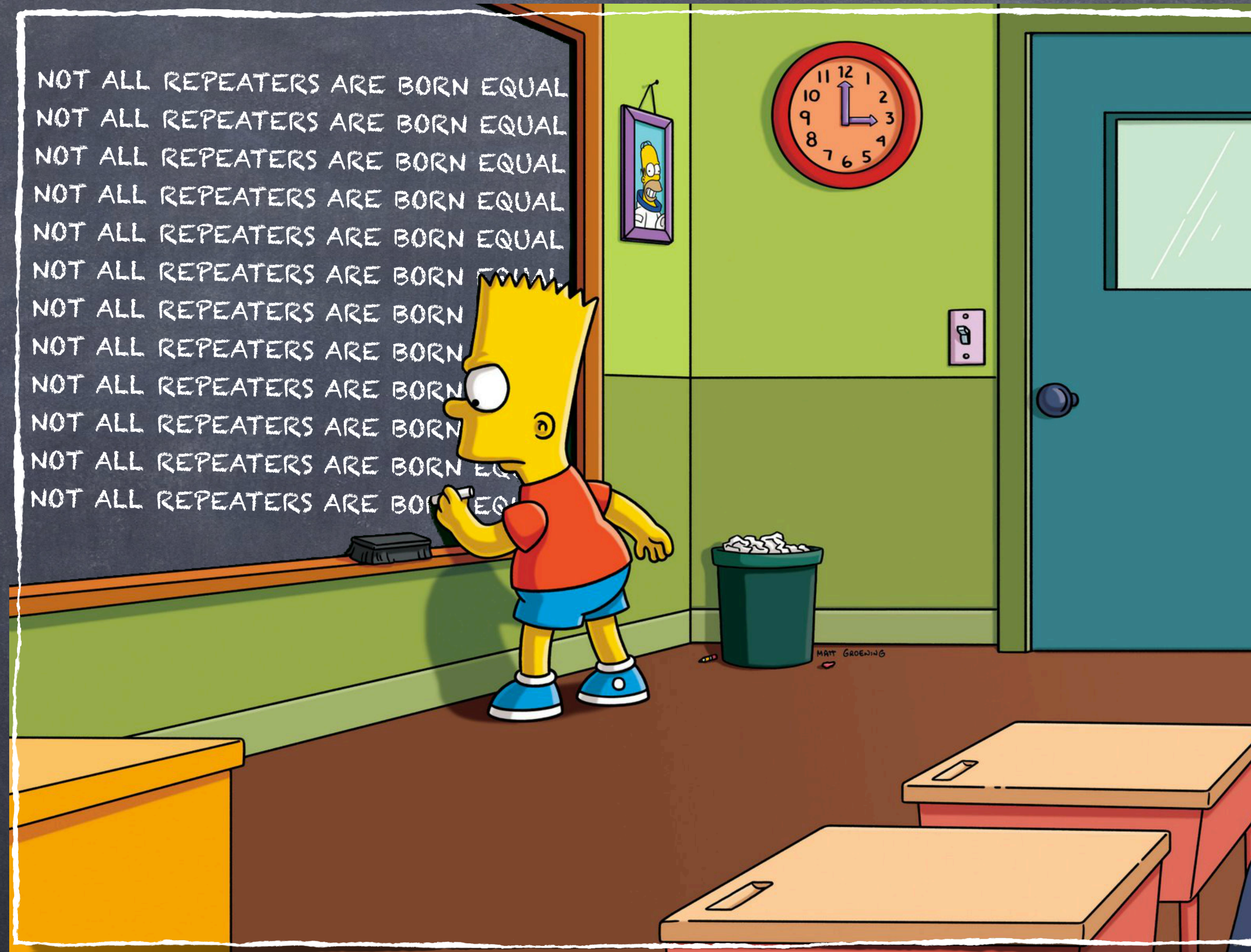


Macquart et al. 2020, Nature



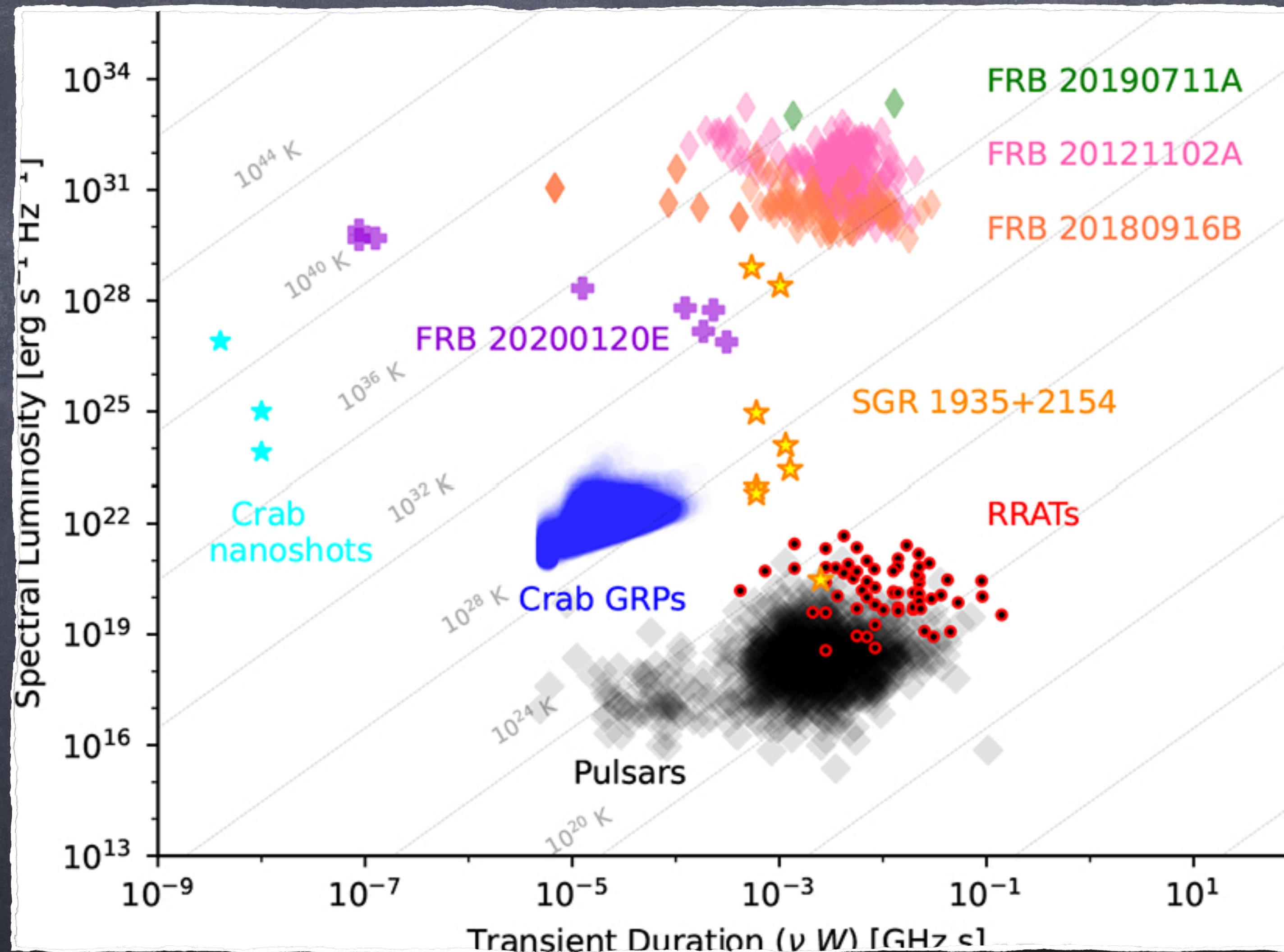


# What have we learnt so far? - 1



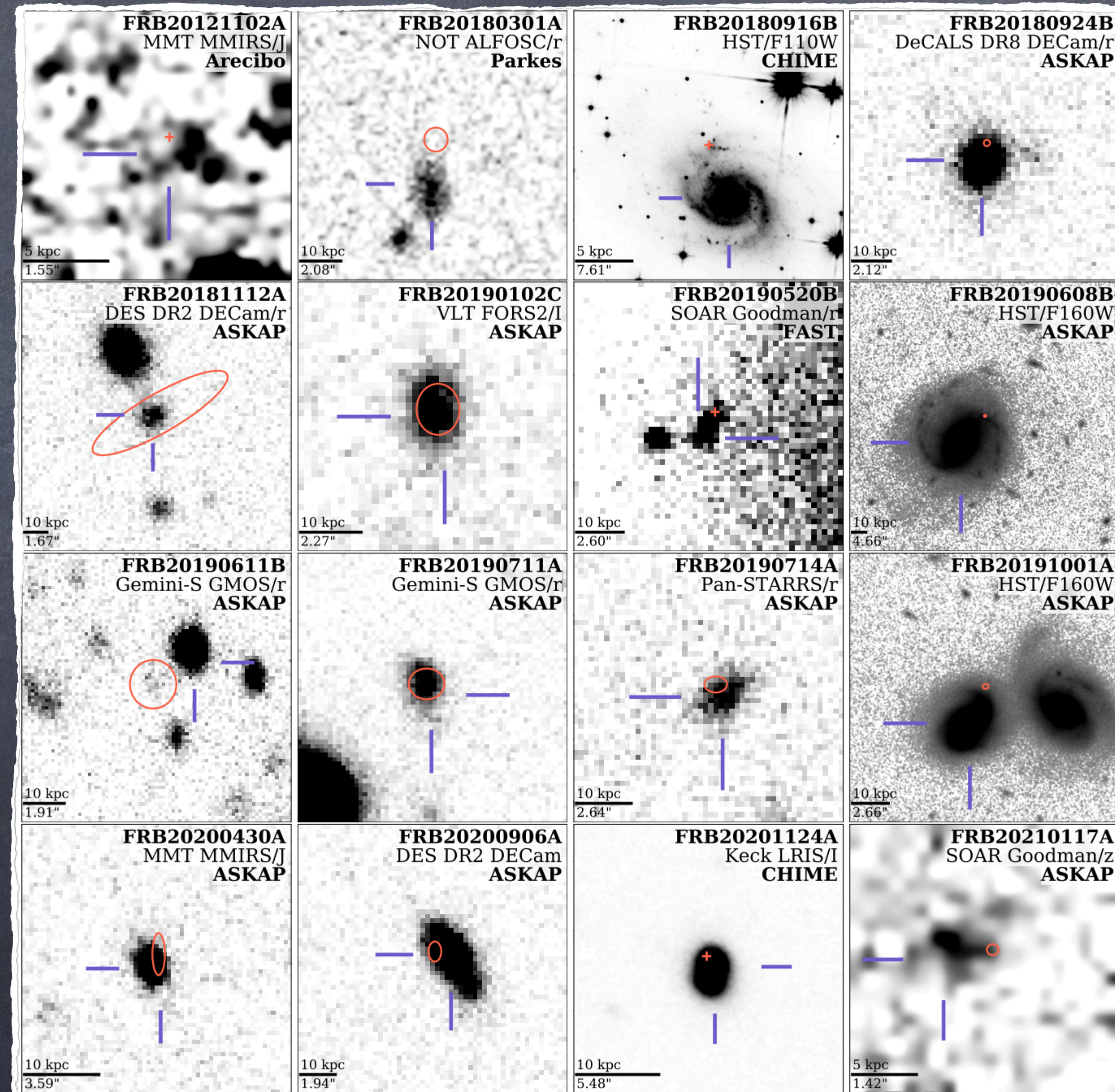


# What have we learnt so far? - 2





# What have we learnt so far? - 3



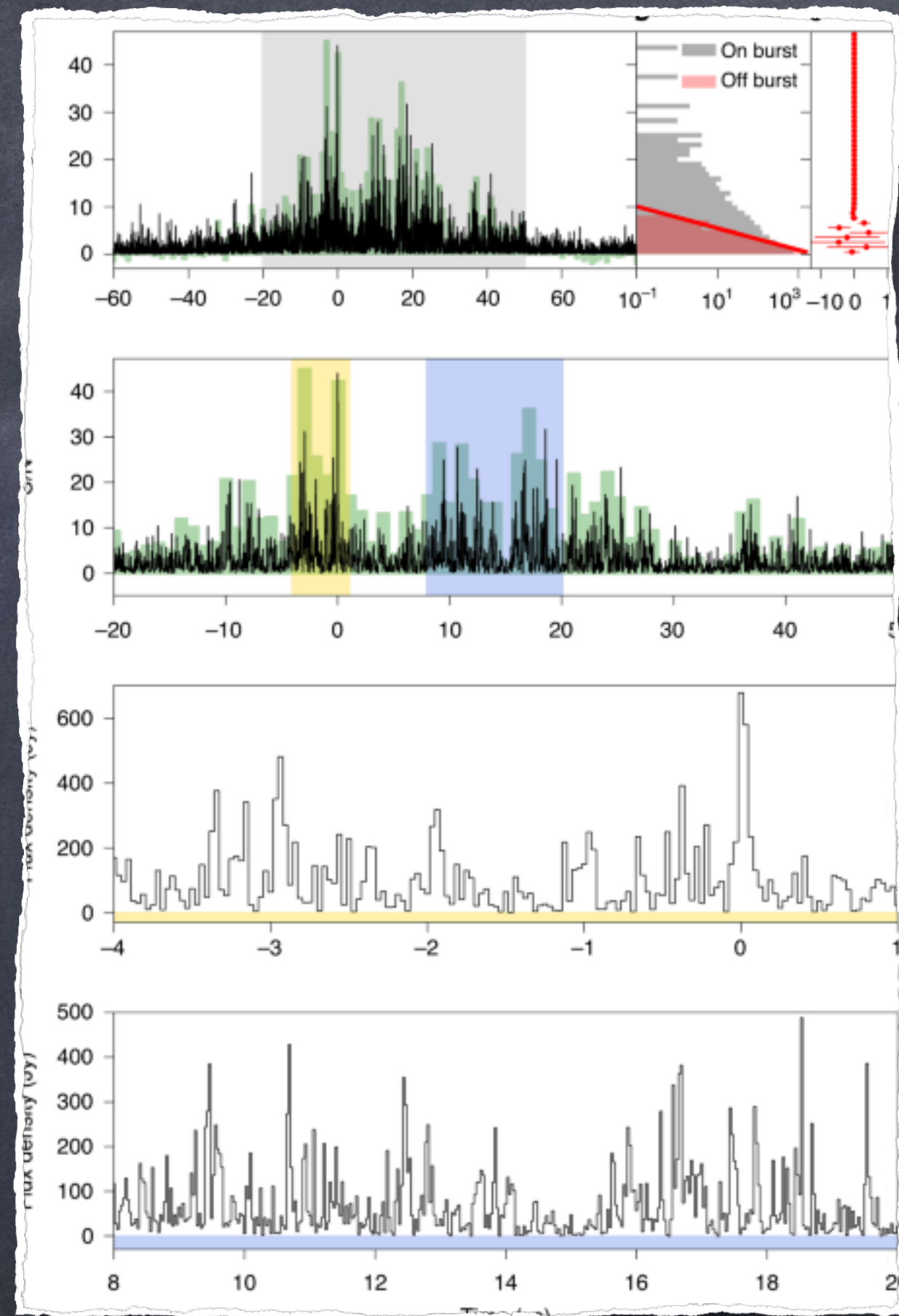


What now?

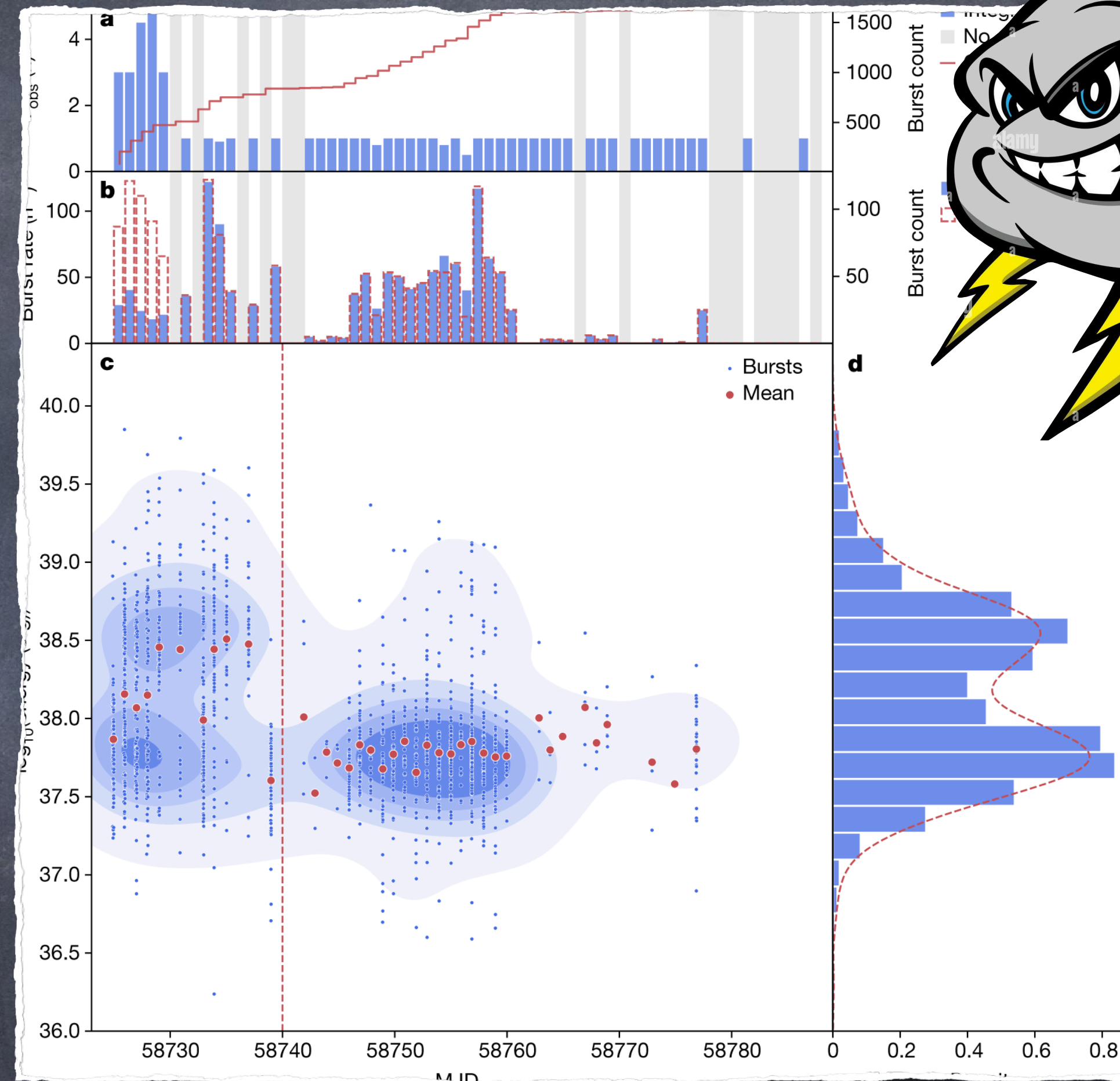




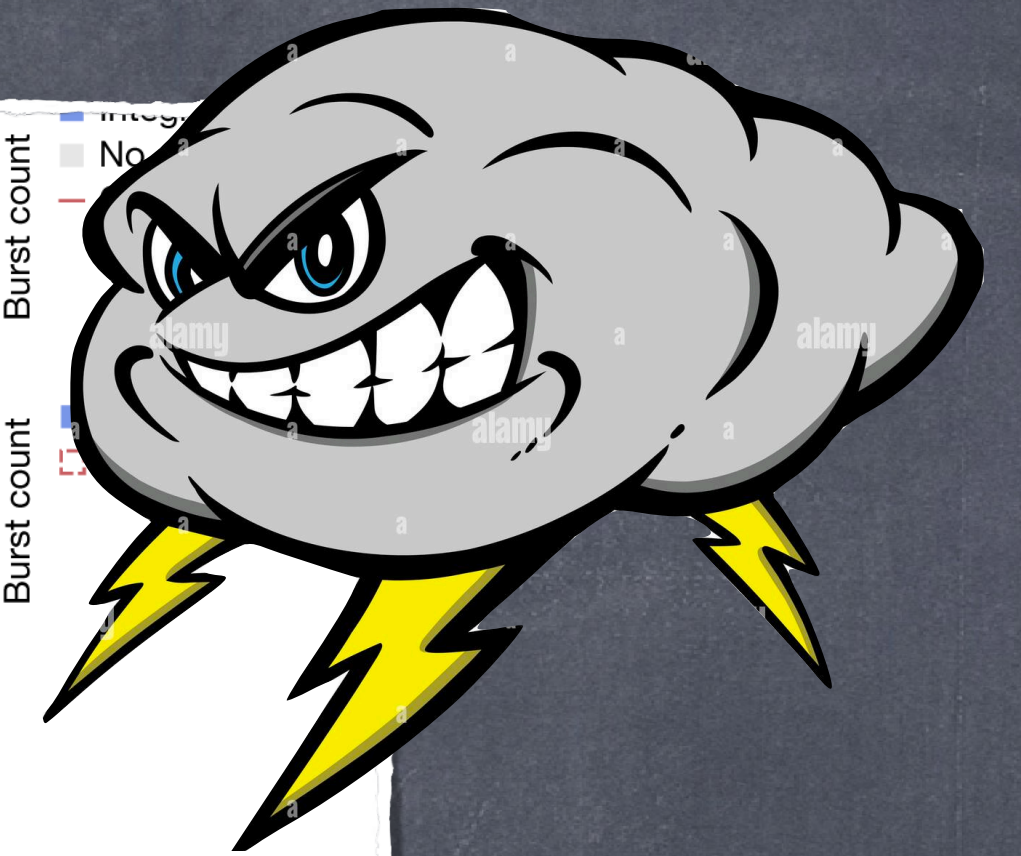
# After 2020:



Nimmo et al. 2021, NatAstro  
 Majid et al. 2021, ApJL  
 Sneelders et al. 2023, NatAstro  
 Hewitt et al. 2023, MNRAS

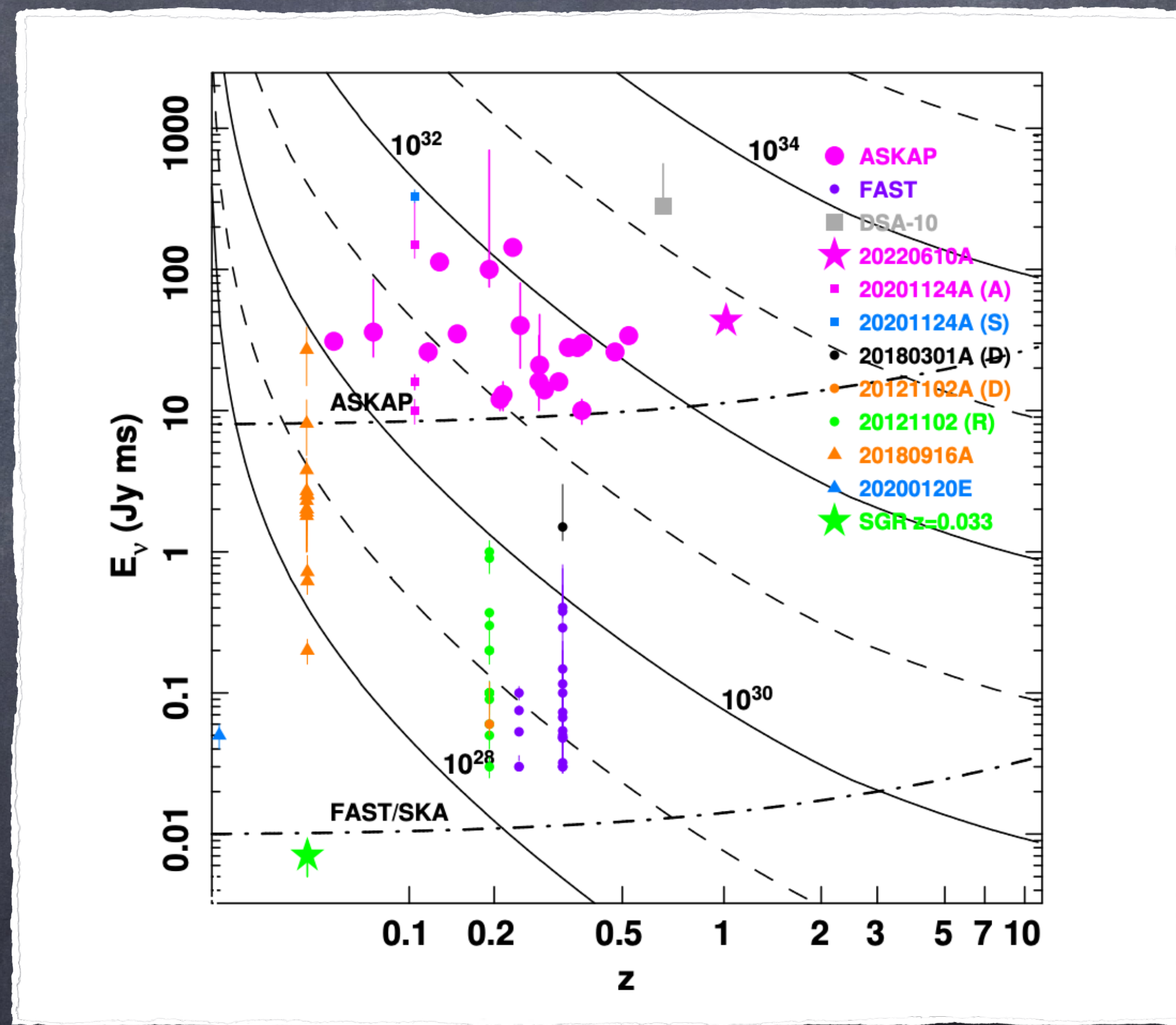


Li et al. 2021, Nature  
 Nimmo et al. 2023, MNRAS  
 Jahns et al. 2023, MNRAS





# After 2020:



Ryder et al. 2023, Nature  
Gordon et al. ApJ submitted



# What now?



WHAT DO WE WANT?



MORE FRBs!



AND HOW DO WE WANT THEM?



FASTER, STRONGER,  
CLOSER, FARTHER,  
WELL LOCALISED,



AND WHEN DO WE WANT THEM?

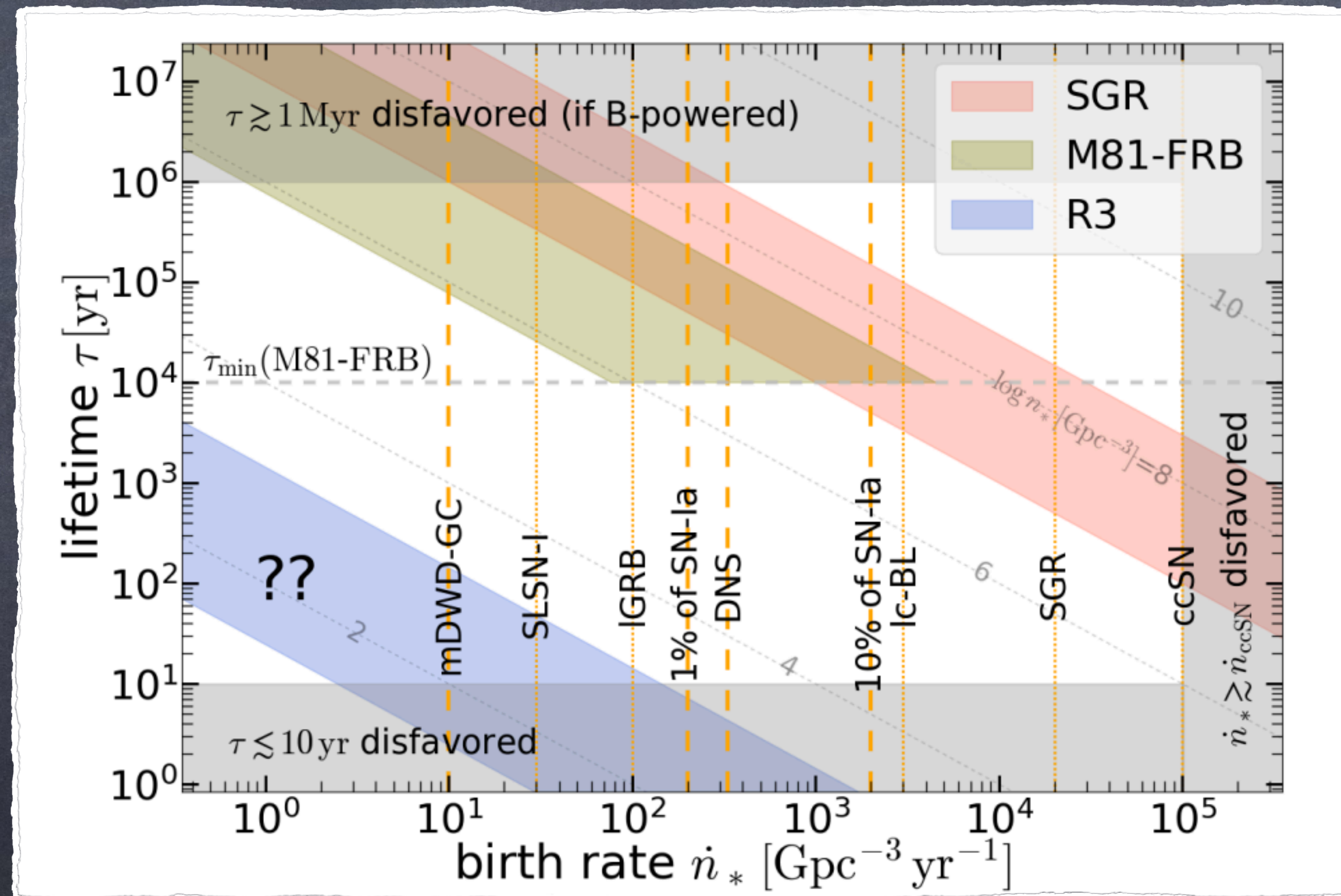


**NOW!**



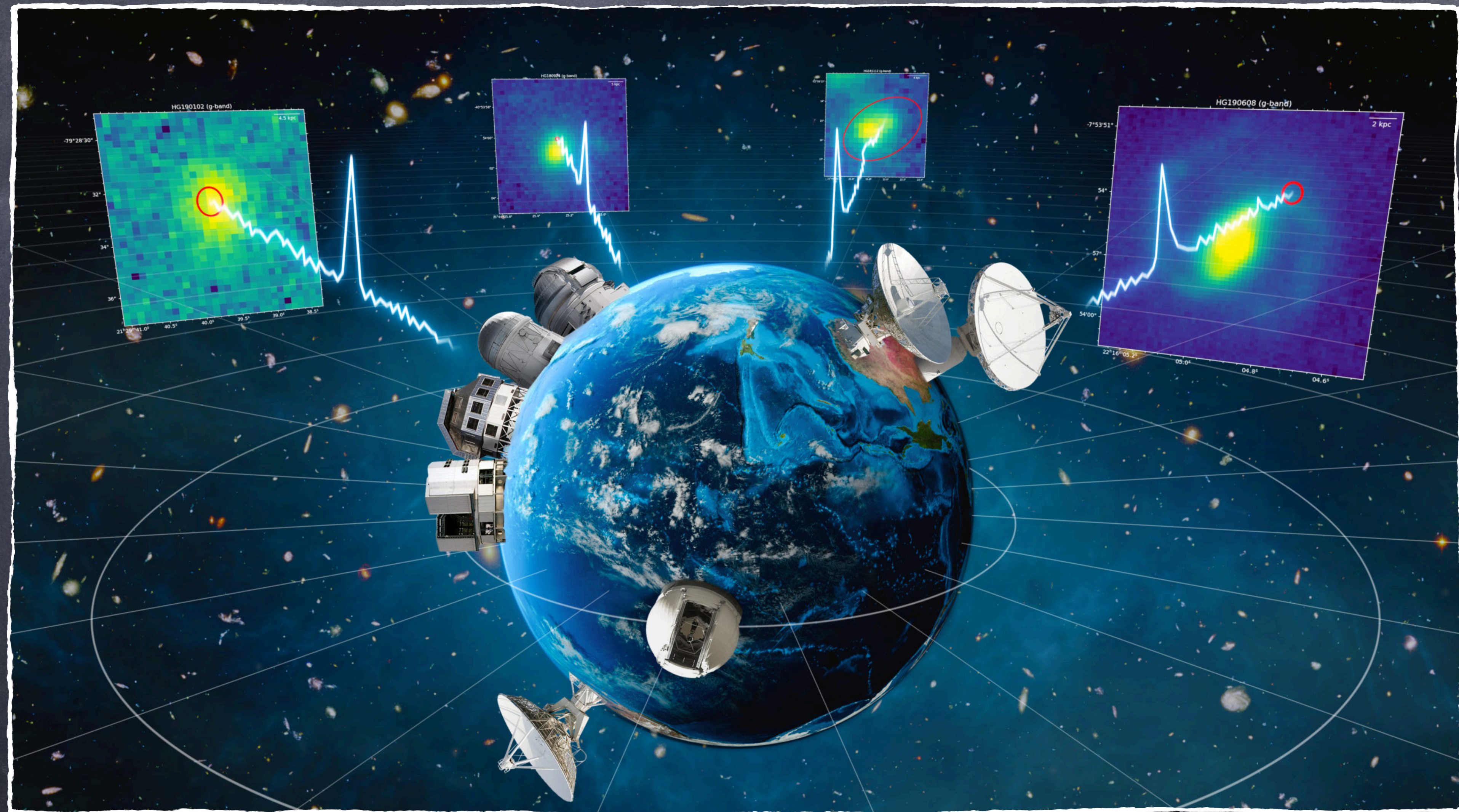


# More repeaters, but the right ones!





# More localisations





# How to get there?

- More FRBs: we need plenty of on-sky time;
- Origin of FRBs: we need sensitive dishes;
- Localisations: we need interferometers.



# How to get there?

- More FRBs: we need plenty of on-sky time;
- Origin of FRBs: we need sensitive dishes;
- Localisations: we need interferometers.



# Multi-wavelength campaigns

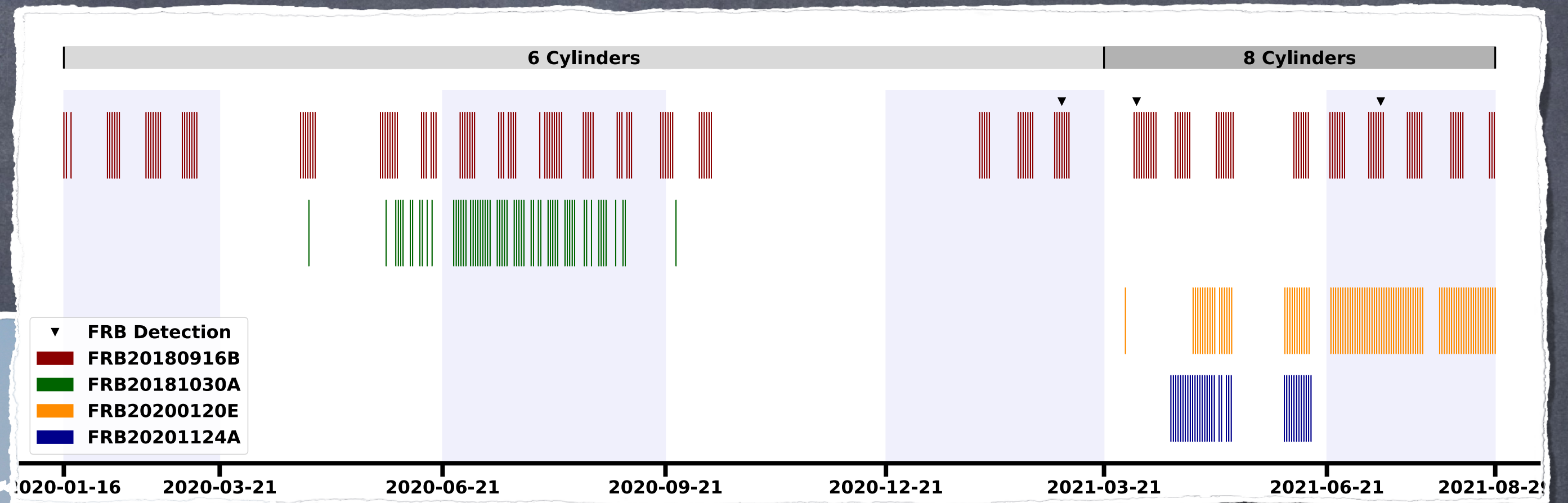
See M. Trudu's talk





# Northern Cross

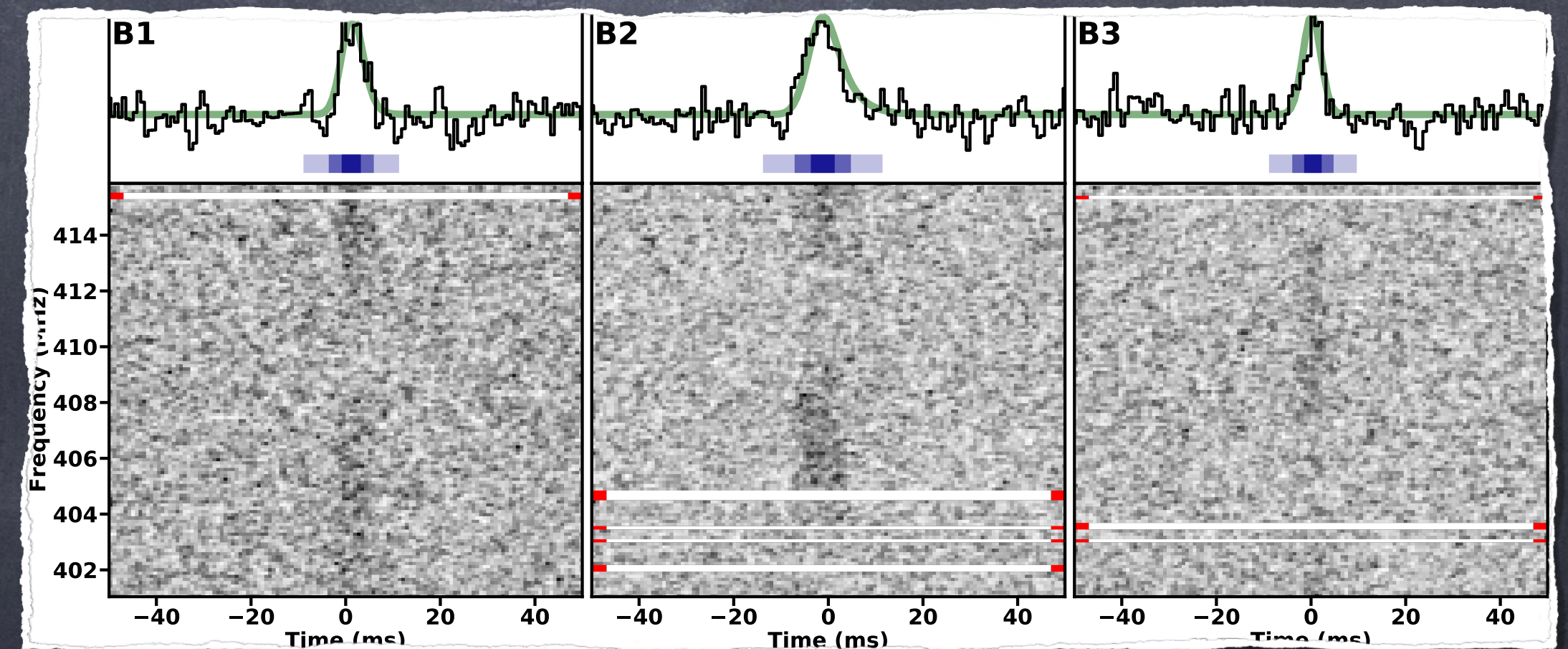
Trudu, Pilia, Bernardi et al. 2022, MNRAS



• Northern Cross / FRB project (Locatelli, Bernardi et al. 2020 MNRAS)

• Active monitoring of R3 since the announcement of periodicity

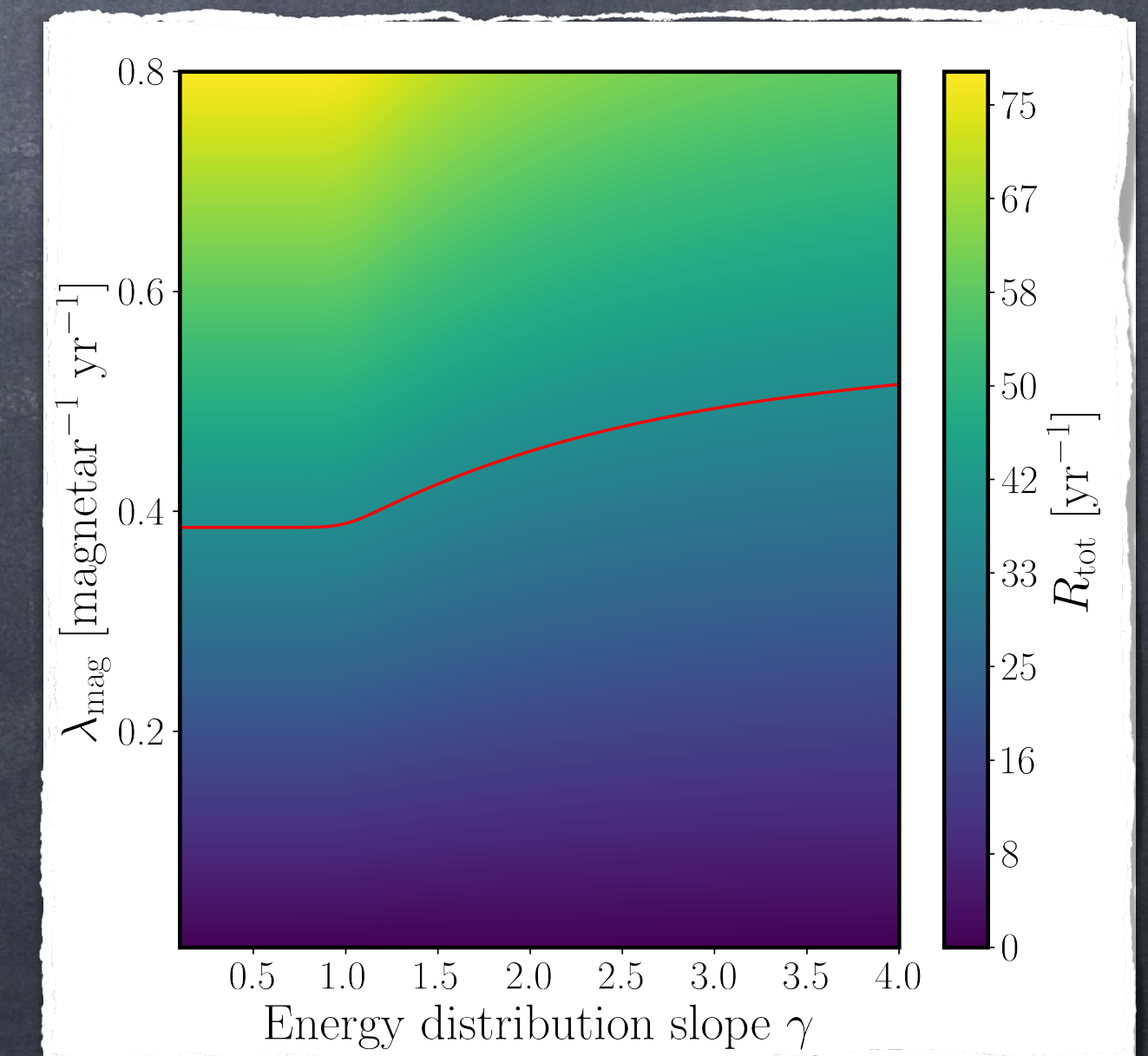
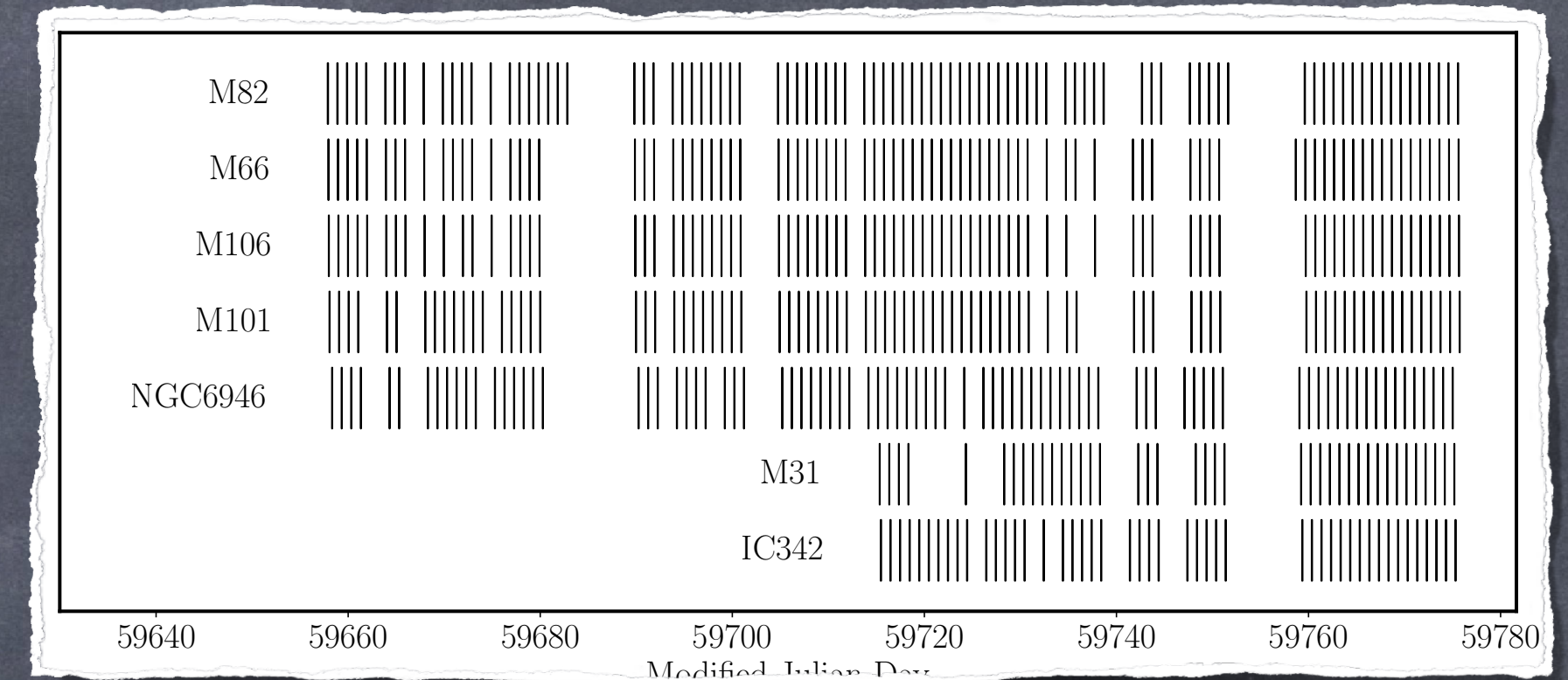
• First light: detection of 3 bursts from R3





# Northern Cross

- 7 nearby galaxies with high star formation rate
- Search for magnetars like SGR 1935
- No FRBs discovered in more than 600 hours
- Magnetars like SGR less common than expected





# PNRR - Next Generation Croce



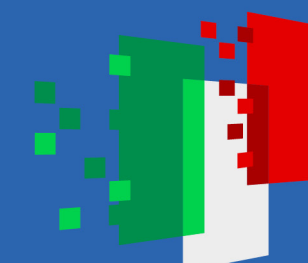
Refurbishment of the E-W branch  
Increased hardware capacity



Finanziato  
dall'Unione europea  
NextGenerationEU



Ministero  
dell'Università  
e della Ricerca



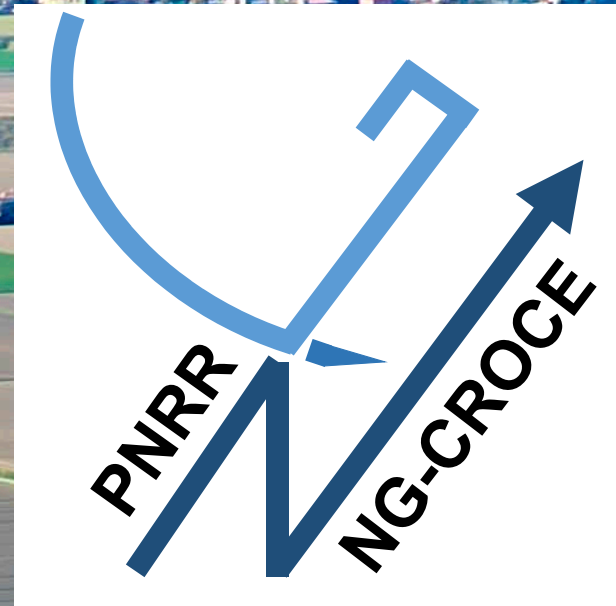
Italiadomani  
PIANO NAZIONALE  
DI RIPRESA E RESILIENZA



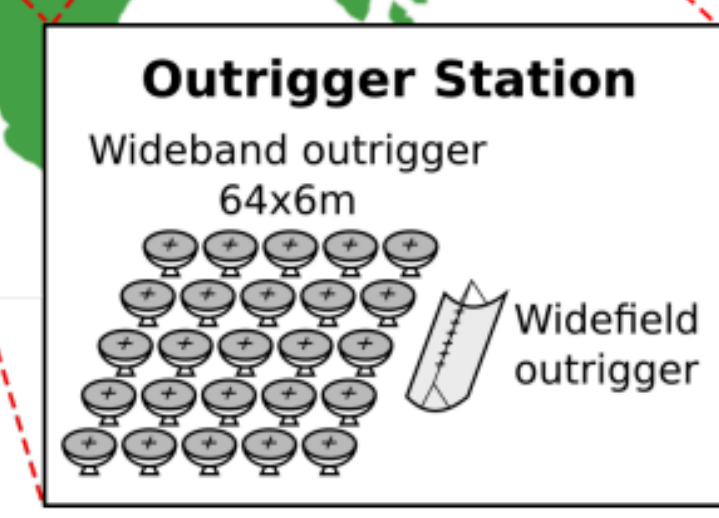
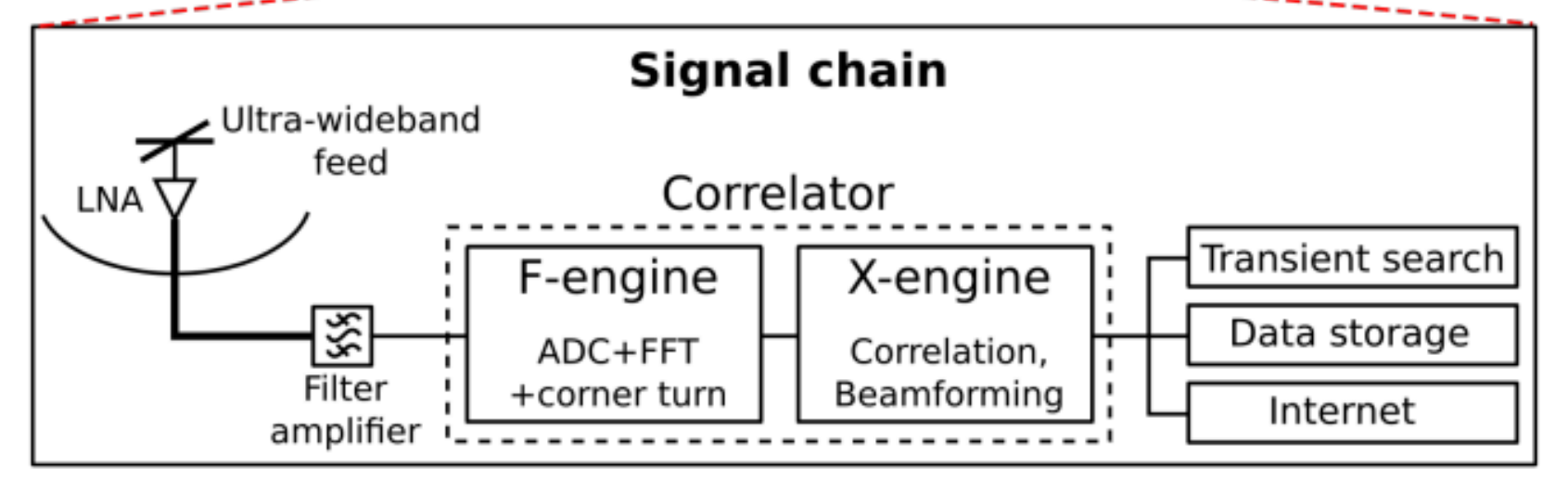
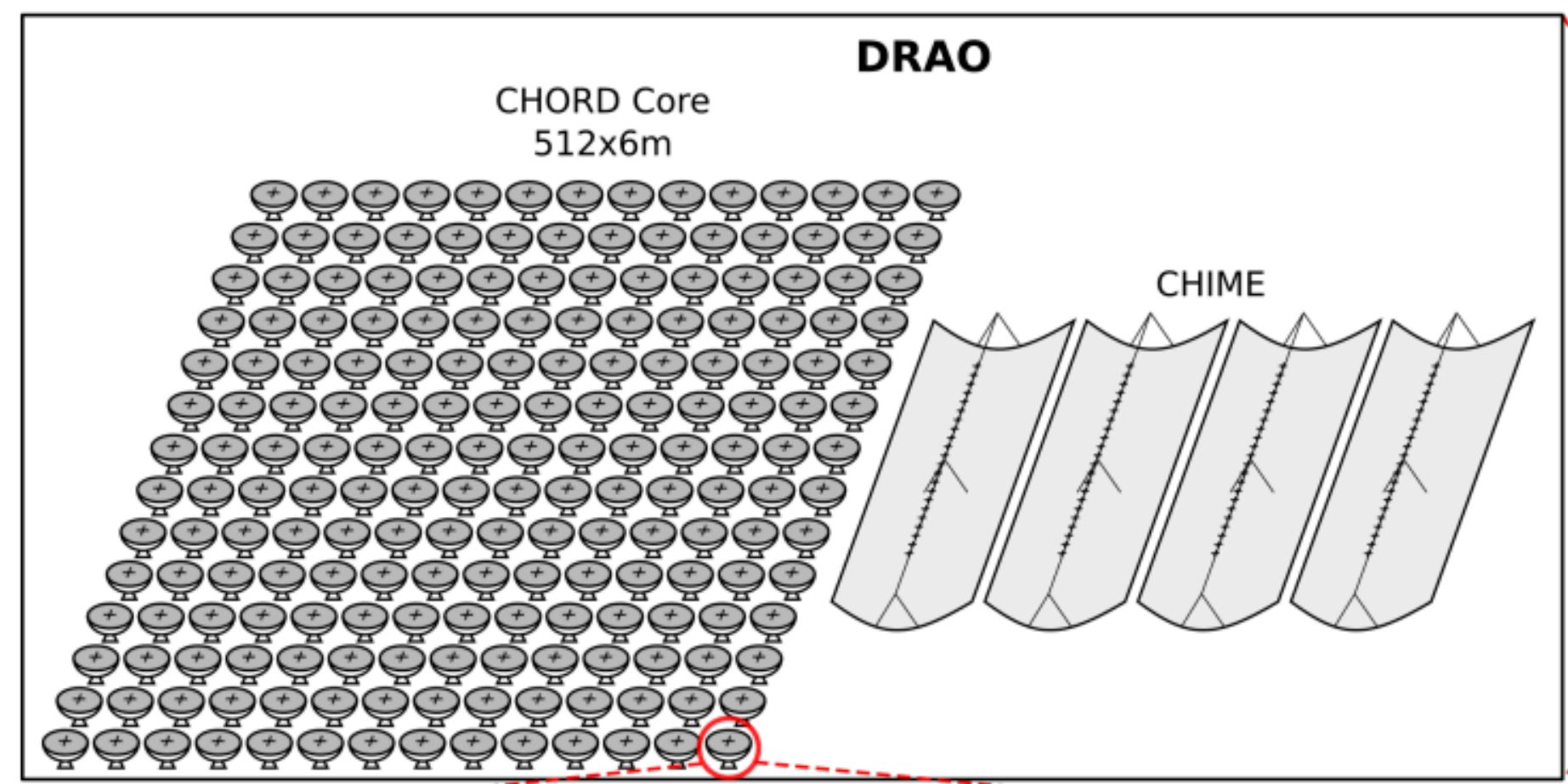
INAF  
ISTITUTO NAZIONALE  
DI ASTROFISICA



# PNRR - Next Generation Croce



CHORD  
Hardware: GPUs + RAMs





Thank you!

