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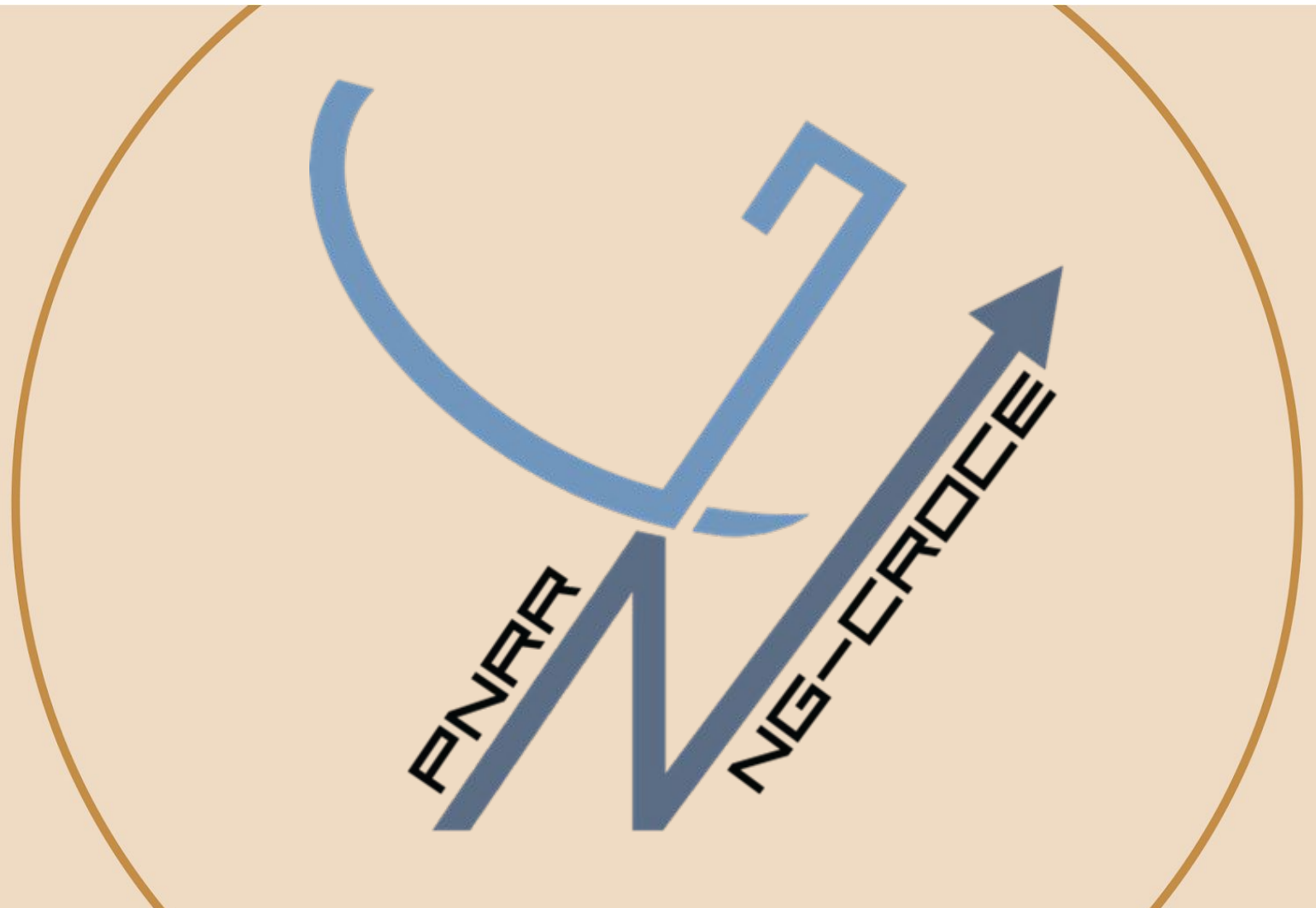
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Preserving and distributing NG-Croce data

Training Meeting NG-Croce

Lunedì 12 Maggio - Giovedì 15 Maggio

Radiotelescopi di Medicina
IRA - Bologna



Luca Bruno



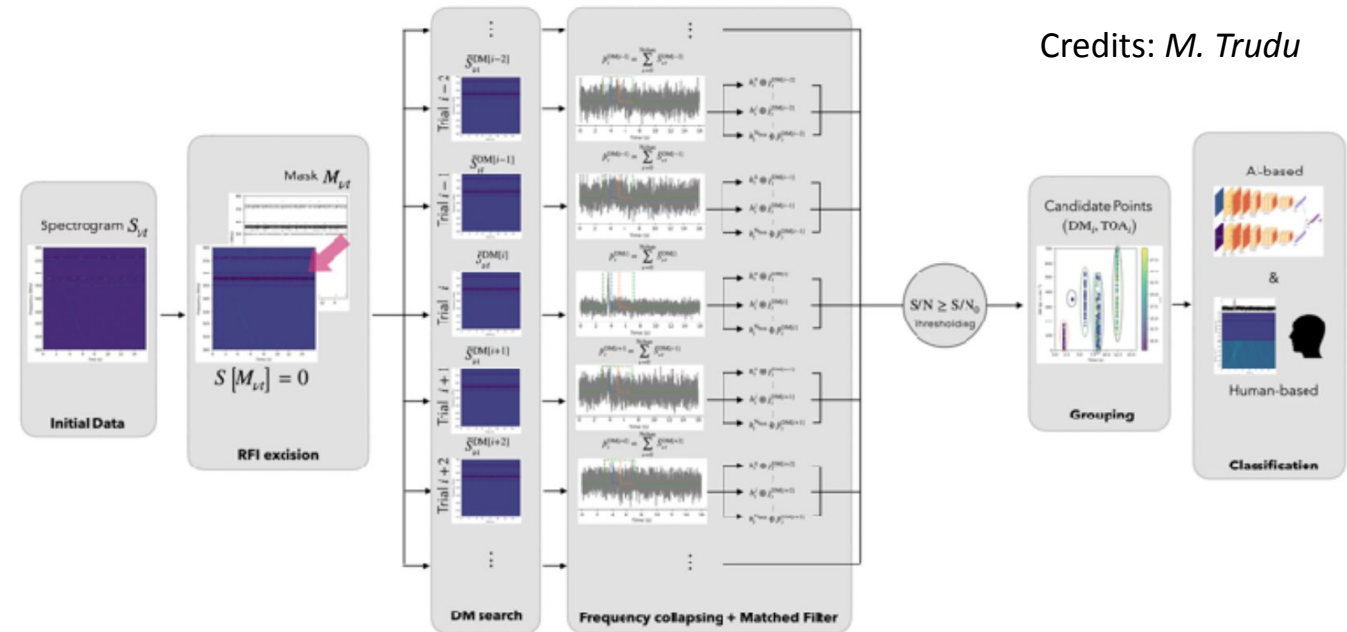
NC data size of FRB observations

Raw data ~300 GB/h + Processed data ~50 GB/h

3 hours x 20 days x 10 months → **~200 TB/yr**

How to deal with ?

1. Storage capacity
2. Distribution of raw & processed data
3. Science reproducibility





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The current *NC* 'archive'

CHIME/FRB

Fast Radio Bursts in realtime

tns_name	repeater_name	ra_1	ra_2	dec_1	dec_2	snr_fitb	dm_fitb	bc_width	fluence	fluence_err
FRB20180909A	FRB20180909A	120.04	-9999	57.004	-9999	13.86	408.647	0.01573	0.9	0.5
FRB20180910A	FRB20180910A	354.83	-9999	89.014	-9999	50.38	684.4081	0.00098	5.6	3
FRB20181201D	FRB20181201D	266.9	-9999	89.125	-9999	16.8	448.266	0.00197	1.4	1.1
FRB20181226F	FRB20181226F	95.87	-9999	83.8	-9999	38.22	236.42	0.00492	11.3	6.1
FRB20190107B	FRB20190107B	49.31	22.37	83.4	83.37	26.84	166.0939	0.00098	4.3	2.5
FRB20190110C	FRB20190110C	249.325	-9999	41.445	-9999	27.76	221.921	0.00295	1.4	0.76

CHIME
public online database



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FRB20190110C	FRB20190110C	249.325	-9999	41.445	-9999	27.76				

NC
private google sheet

CHIME
public online database

FRBs at the Northern Cross							
File Modifica Visualizza Inserisci Formato Dati Strumenti Estensioni Guida							
	A	B	C	D	E	F	G
1							
2	Source Name	Burst Time (UTC)	Burst Width (ms)	DM (pc cm ⁻³)	S/N	Flux (Jy)	Fluence (Jy ms)
3	FRB20180916B (R3)	59276.5954859605	4.76	349.28	14.5	20	96
4	FRB20180916B (R3)	59307.5148011862	5.95	349.57	21.7	22	135
5	FRB20180916B (R3)	59408.2528584486	4.37	349.64	12.5	16	71
6	FRB20180916B (R3)	59699.52604	6.35	349.8	15	15	96
7	FRB20180916B (R3)	59800.25185	5.7	350.7	20	19	108
8	FRB20220320	59658.05142	1.8	303	11	32	58
9	FRB20220912A	59868.88599	4.1	219.6	15	18	74
10	FRB20220912A	60125.1603	3.1	220.2	12	7.4	23
11	FRB20220912A	60133.14275	9.4	220.1	10	4.3	40
12	FRB20220912A	60136.13248	4.1	219.6	14	6.8	28
13	FRB20220912A	60138.12095	16	219.7	15	4.8	77



The current *NC* 'archive'

CHIME/FRB

Fast Radio Bursts in realtime

tns_name	repeater_name	ra_1	ra_2
FRB20180909A	FRB20180909A	120.04	-9999
FRB20180910A	FRB20180910A	354.83	-9999
FRB20181201D	FRB20181201D	266.9	-9999
FRB20181226F	FRB20181226F	95.87	-9999
FRB20190107B	FRB20190107B	49.31	22.37
FRB20190110C	FRB20190110C	249.325	-9999

A *CHIME*-like database provides:

- final data products → **science-ready data**
- no filterbank data → reproducibility

NC
private google sheet

6	FRB20180916B (R3)	59699.52604	6.35	349.8	15	15	96
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The *INAF Radio Archive*

Simple search VLBI-IT search SD search Pulsar and transients search

File name

Name resolver:

☐ RA (J2000) ☐ Dec (J2000) Radius (arcmin)

☐ Toggle all

☐ Observation date From: To:

☒ Project id

☒	File name	Type	Policy	Proj id	Freq min [MHz]	Freq max [MHz]
☐	20181210-102219-21-18-3C286.tar	Single Dish	FREE	21-18	22137.554	22387.554
					22137.554	22387.554
☐	20181212-042850-20-18-3C286.tar	Single Dish	FREE	20-18	8180	8860
					8180	8860

Radio Archive

collects raw data of *INAF*
radio telescopes

Requirements:

homogeneous header
keywords

Issue: backend settings
should not be changed!



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☐	20181212-042850-20-18-3C286.tar	Single Dish	FREE	20-18	8180	8860
					8180	8860

INAF Radio Archive provides:

- High **storage capacity** ●
- raw filterbank data → **reproducibility** ●
- no final data products → science-ready data ✖

Radio Archive

How data of *INAF*
telescopes

ts:
us header

Issue: backend settings
should not be changed!



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What is really needed ?

	NC group	FRB community	notes
public db	✓	✓	INCART 
raw .fil	✓ ?	✗	private NC-specific calibration files; big size; technical issues
cut .fil	✓ ?	✓ ?	e.g. do your own fit; small size
non detections	?	?	big size; future re-analysis? remove?



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The *INCART* database

Prototype of *CHIME*-like db

- **flexible**: SQL db + python
- **accessible**: HTML web interface

Requirements: header.txt + analysis
pipeline logfile.txt

Policy TBD (?)

1. Which information ?
2. Which publication cadence ?

Italian Northern Cross Archive of Radio Transients

Welcome to **INCART**! The archive collects observations of **FRBs** detected by the Northern Cross and Medicina-Grueff radio telescopes in Medicina (Bologna, Italy).
Download complete [catalogue.fits](#) or check it online.



Left: Northern Cross radio interferometer. Right: Medicina Grueff single dish radio telescope. **Image credits**: Lesia Vasylenko

Search by

☐ Complete catalogue

☒ FRB Name

FRB20230201A

☐ Position

RA deg OR hh:mm:ss

DEC deg OR dd:mm:ss

searching radius arcmin (def. 5')

☐ Date of observation

from gg/mm/aaaa to gg/mm/aaaa

Submit

Reset





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Take-home messages

- Finding the **best archiviati on and distribution strategy** before completion of NC upgrade is crucial
- **Coordination efforts** among backend administrators, pipeline developers, FRB data users, *INAF Radio Archive* system managers
- Ongoing development of **INCART database** + policy definition

Thanks for your attention

... Questions (and ideas)?