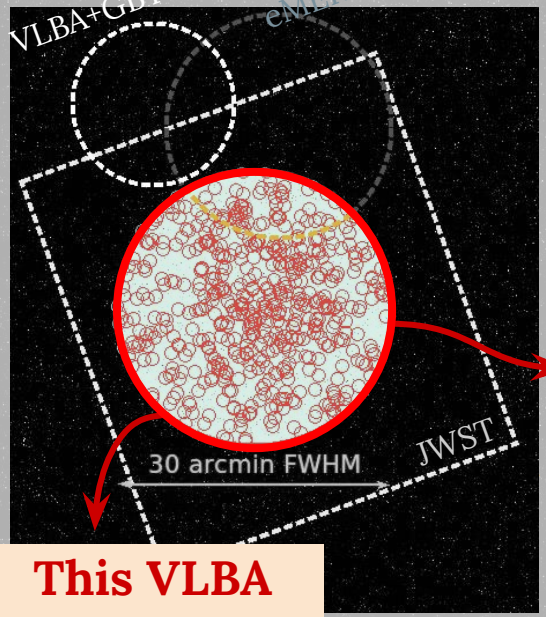
Minigrant RSN1 (20 k€):

Harnessing the power of VLBA towards a census of AGN and star formation at high redshift (PI: I. Delvecchio - OAB)



This VLBA survey

In a Nutshell:

Targets	**>500** massive, **non-AGN** galaxies at 0.5<z<4.5
Frequency	1.4 GHz (L-band)
5σ depth	~20 μJy/beam
Other notes	Data analysis in progress

Main science objectives:

WP1

Inferring (AGN-corrected) radio-SFR conversions in the μJy radio sky

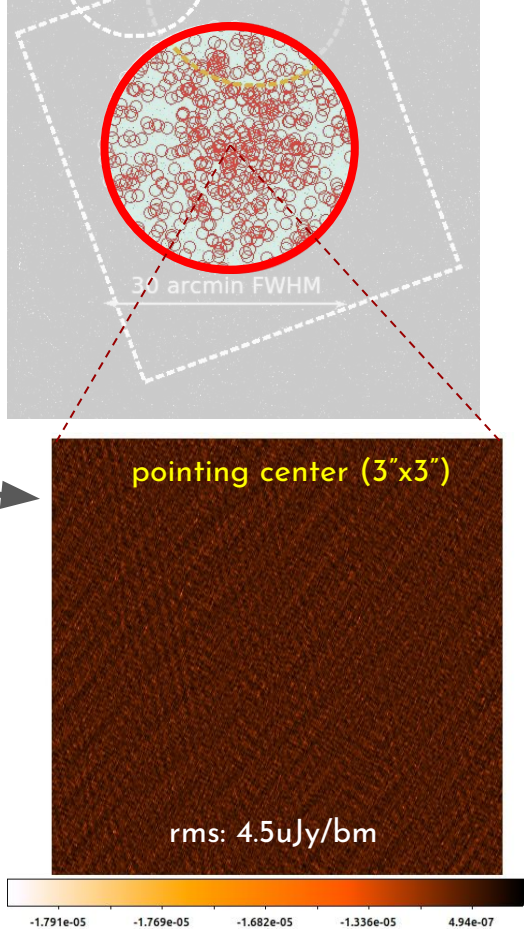
WP2

Constraining the duty cycle of elusive radio AGN in massive high-z galaxies

- Status of this minigrant project (2023)

Data Analysis:

- ❏ Data reduction and calibration completed (4TB raw data)
- ❏ Analysis, calibration and imaging with two independent VLBI pipelines (VPIPE, Radcliffe+2018; rPICARD, Janssen+2019)
- ❏ Troubleshooting caused delays (see Sect. *Criticalities*)
- ❏ Imaging of the pointing center and first few targets. Deepest region reaches rms=4.5 uJy/beam



Conferences and workshops attended:

- ❏ Bologna & Friends (https://indico.ict.inaf.it/event/2300/): invited talk
- ❏ Bologna-VLBI (https://vlbi-40.ira.inaf.it/): poster presentation on this minigrant, and good for visibility to the VLBI community
- ❏ CASA-VLBI workshop (https://indico.astron.nl/event/308/), ASTRON. Here I tied new collaborations and engaged with the developer of the rPICARD pipeline for VLBI calibration (Janssen et al. 2019)

Fundings: about 13k€ have been used so far, in line with foreseen expenses.

- ❏ Two visits from collaborators (M. Sargent & J. Radcliffe) to INAF-OAB
- ❏ Purchase of a new laptop for heavy data processing, and large external storage
- ❏ Attendance of conferences, workshops and multiple collaboration visits within INAF

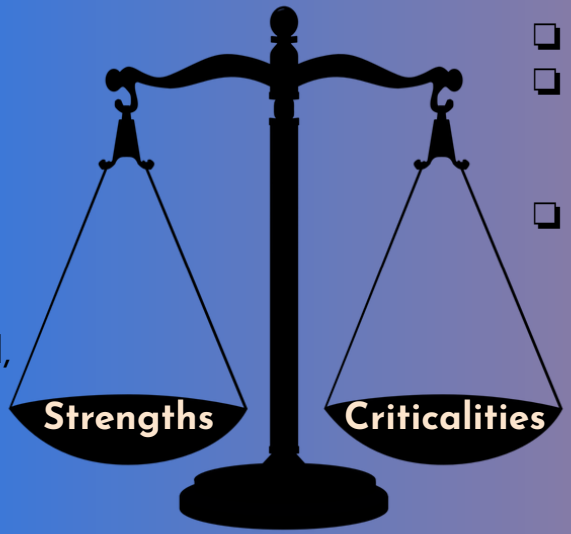
- Future plans, strengths and criticalities

On-going and future plans:

- ❏ Imaging of the full input sample (>500 galaxies, ~10TB expected)
- ❏ Collaboration trip to visit J. Radcliffe in Pretoria (South Africa, in Dec/2023) and finalize VLBA imaging
- ❏ Source catalogue, images, and data products will be released to the community
- ❏ Science exploitation (WP1 & WP2) and publications expected from early 2024

Strengths:

- ❏ This minigrant was essential for purchasing laptop and IT devices, and for funding a number of collaboration trips, without which data calibration would not have been possible.
- ❏ As of now, nearly all data reduction issues have been fixed, owing to the financial support from this minigrant
- ❏ Smoother phase expected from now on



Criticalities:

- ❏ Little manpower
- ❏ Poor computing resources (several weeks full-time for imaging the entire dataset on a good laptop)
- ❏ Limited expertise in wide-field VLBI techniques within INAF, which caused delays, as troubleshooting over weekly meetings had to be done remotely. This was partly expected, as the VPIPE pipeline had never been tested properly on VLBA data before. We hope that our effort can push these techniques to the mainstream.