

# Low-Frequency Technosignature Search Using NenuFAR

Ruaidhrí Campion

Supervised by Dr Evan Keane

# Background

# NenuFAR

- Located at Nançay Radio Observatory, France
- Part of the LOw Frequency ARray (LOFAR)
- Operates between 10-85 MHz



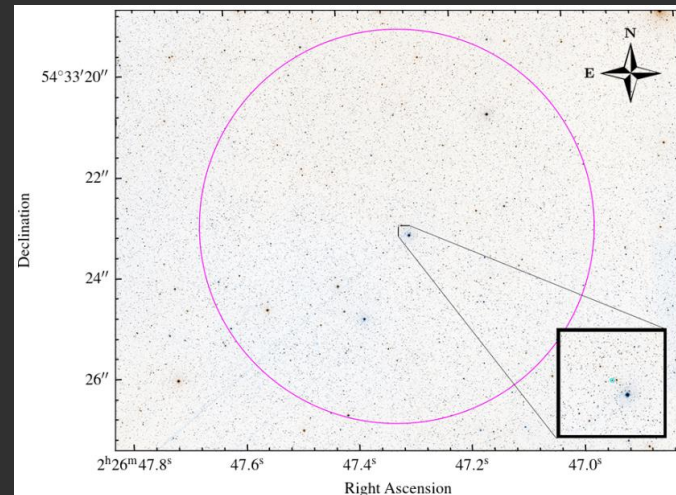
Observatoire Radioastronomique de Nançay, <https://nenufar.obs-nancay.fr/en/homepage-en/>

ASTRON,  
<https://www.astron.nl/telescopes/lofar/>



# Angular Resolution

- $FWHM \propto f^{-1}$
- Can exploit large FOV of low-frequency observations in SETI

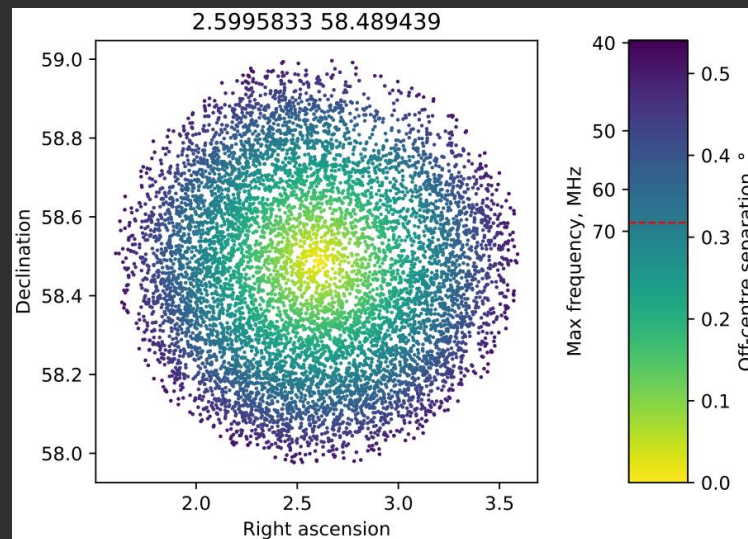


Johnson et al., A Simultaneous dual-site technosignature search using international LOFAR stations (unpublished)

# Results

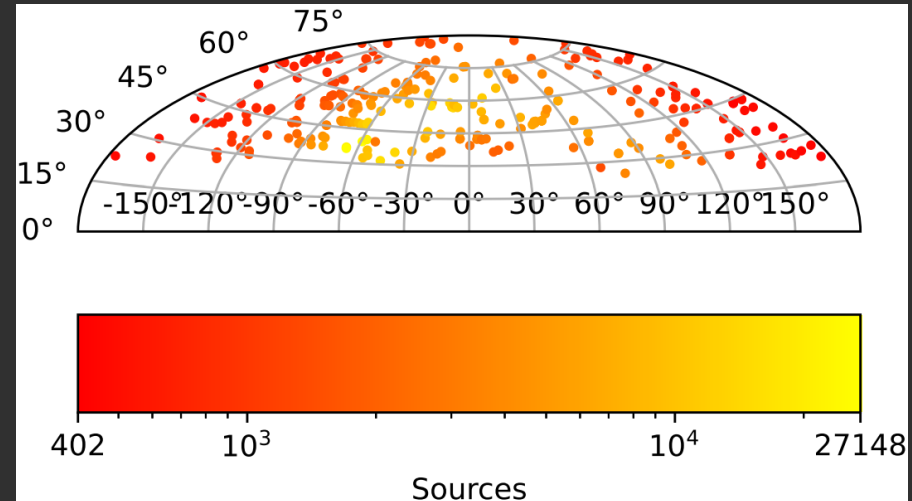
# Observations

- 281 observations centred on TESS exoplanets
- 39.8-67.7 MHz
- $0.32\text{-}0.54^\circ$



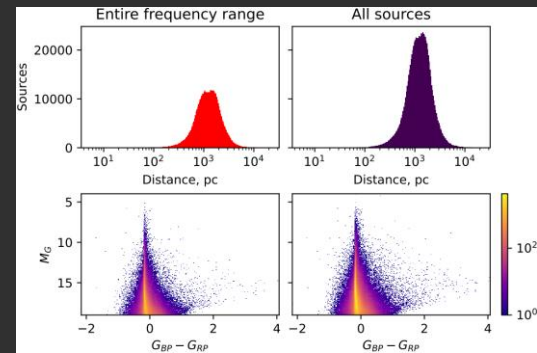
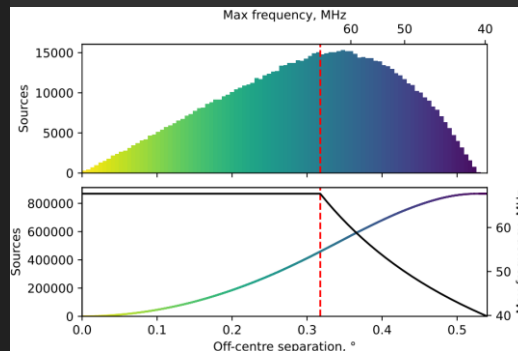
# Stellar Catalogue

- 4,144,330 total stars observed (Gaia DR3)
- Reduced to 868,664 unique stars based on coordinate & distance error thresholds



# Stellar Details

- 459,071 stars searchable across entire frequency range (separation  $< 0.32^\circ$ )
- Median separation of  $0.31^\circ$  & distance of 1,242 pc





Further Work

# Technosignature Search

- Narrowband drifting signals – turboSETI
- Transient signals – SPANDAK

# Questions