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With thanks especially to:

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Some thoughts on the SWARM's niche
Galactic science at low frequencies
Some thoughts about what to do next



- LoTSS : 6", 0.1 mJy/beam, Dec>0, 150 MHz
 - LOFAR resolution could reach ~1" with international baselines at 70 MHz
- SKA Low: ~15" resolution at 70 MHz
(extragalactic confusion limit at 2 mJy/beam)
- LWA-SWARM: ~1" resolution, can see to about -40 degrees



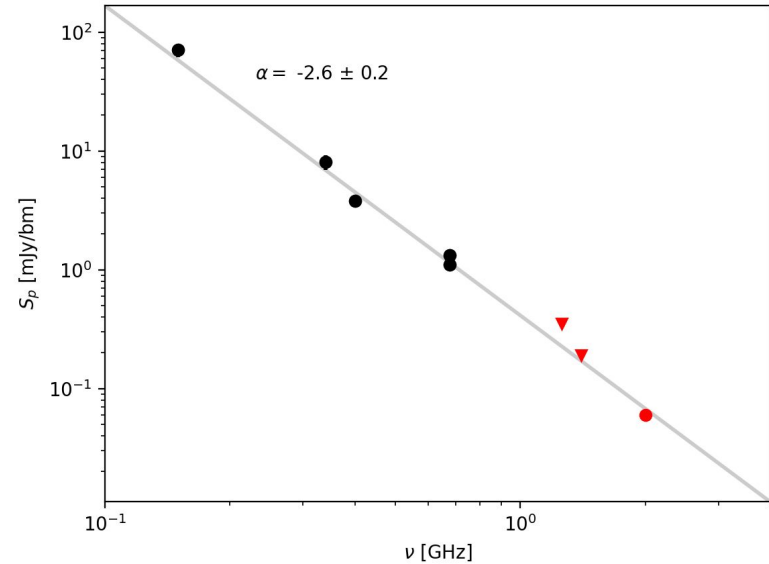
- Noise level approx 20 mJy in 1 hour, better with OVRO
- Confusion limit ~ 30 μ Jy
- Spectral index steeper than -1.4 will make this comparable sensitivity to 1 epoch of VLASS
 - Typical pulsar spectral index is about 1.4
- Getting to -0.7 index sources seen by VLASS takes about 200 hours
 - Large swaths of Galactic Plane in reasonable exposure times in a year



Search for pulsars as steep
spectrum objects

High DM, “spiders”,
high eccentricity

Understand low frequency
cutoffs of pulsars



A pulsar spectrum in GLIMPSE-C01, a highly extinguished Galactic globular cluster. It was confirmed in archival timing data after being discovered from VLITE data.

(McCarver et al, in prep)



Mapping out gas with free-free absorption:

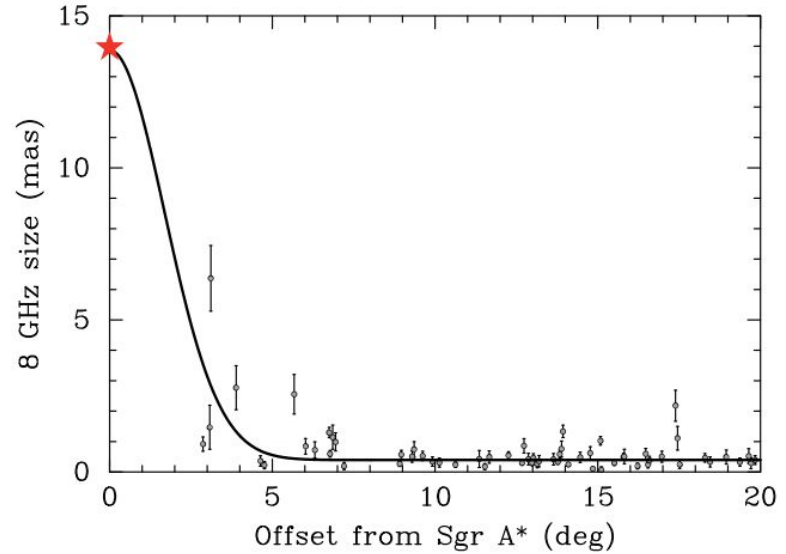
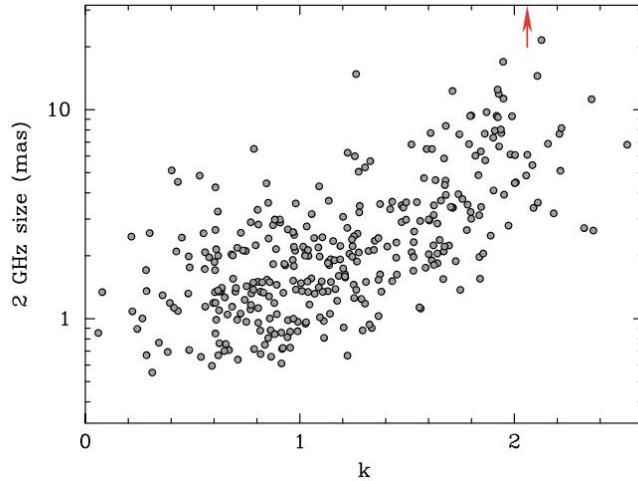
$$\tau \approx 3.28 \times 10^{-7} \left(\frac{T}{10^4 \text{ K}} \right)^{-1.35} \left(\frac{\nu}{\text{GHz}} \right)^{-2.1} \left(\frac{\text{EM}}{\text{pc cm}^{-6}} \right).$$

So, for 70 MHz, $N_{\text{H}}=1$, $d=8$ kpc, get $\sim\tau=0.7$

With bright standard spectrum sources behind the Plane, can map out free free absorption



ISM effects II: Scatter Broadening

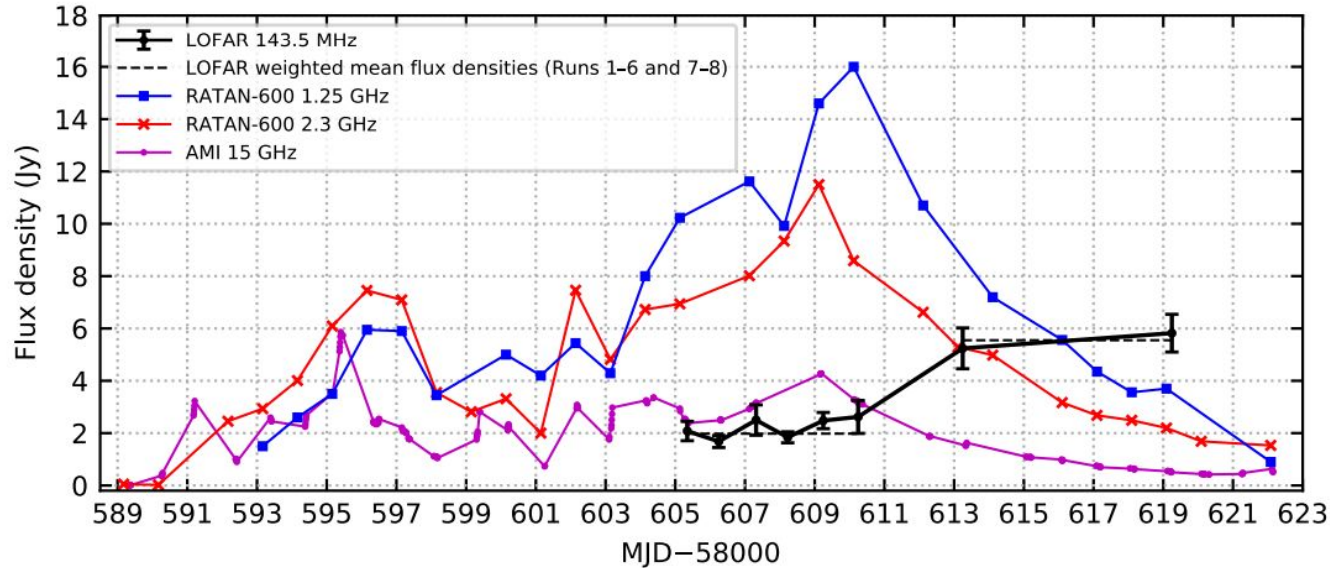


Figures from Kovalev & Pushkarev (2015)

Scatter sizes typically vary as ν^{-2} , but that depends on size scales for turbulence in ionized ISM; LWA gives a probe on larger physical scales going toward Galactic Center



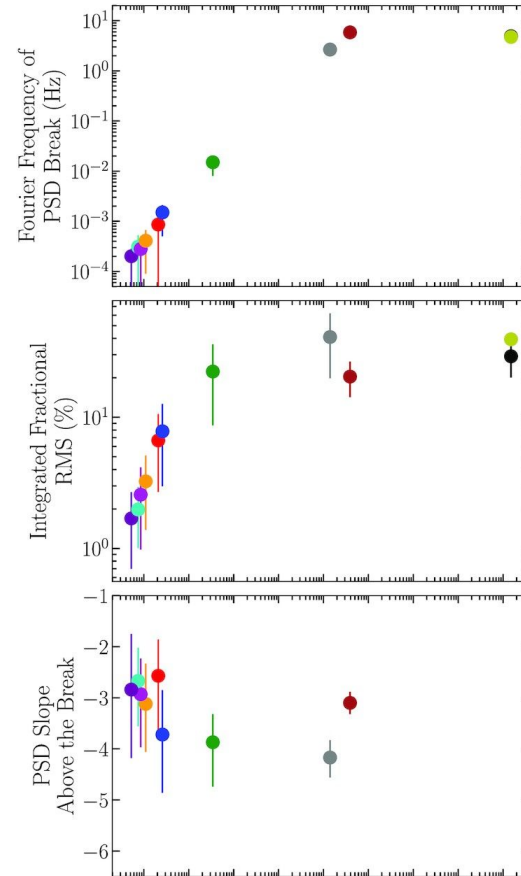
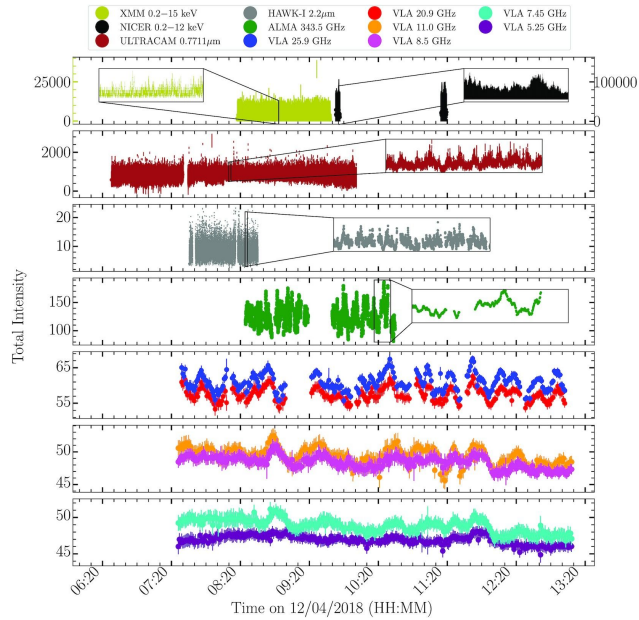
X-ray binaries in outburst



From Broderick et al. 2021



X-ray Binaries in Outburst II

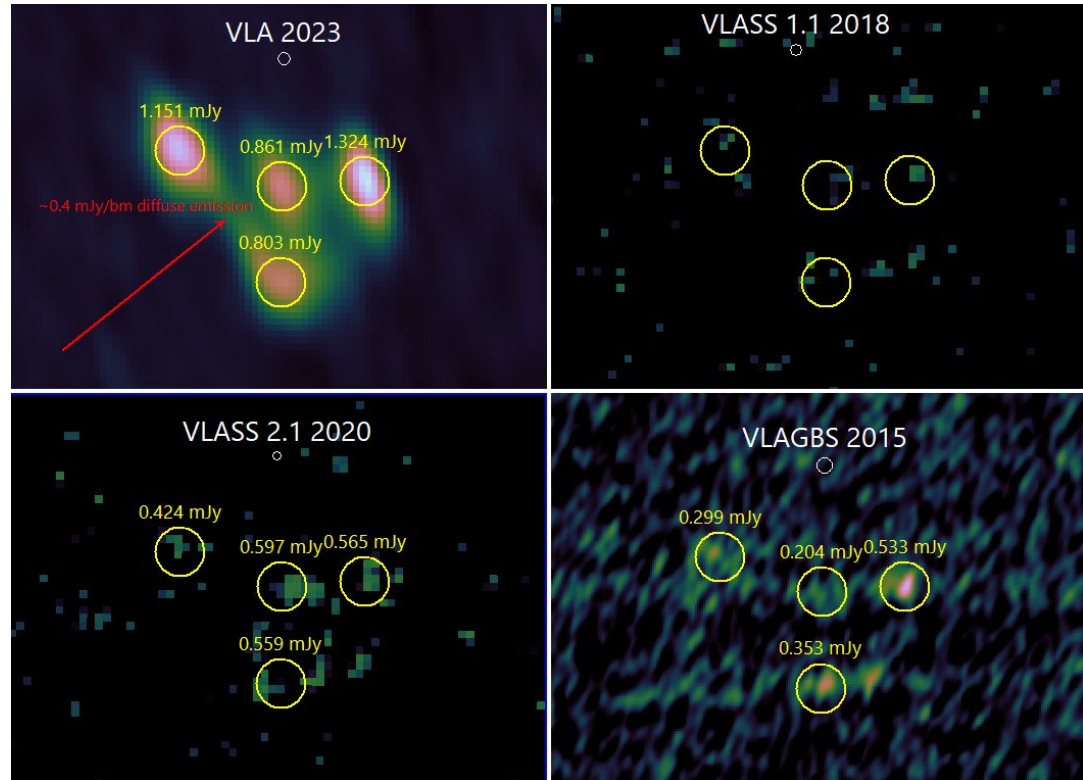


From Tetarenko et al. 2021
Expect days lag at 30 MHz

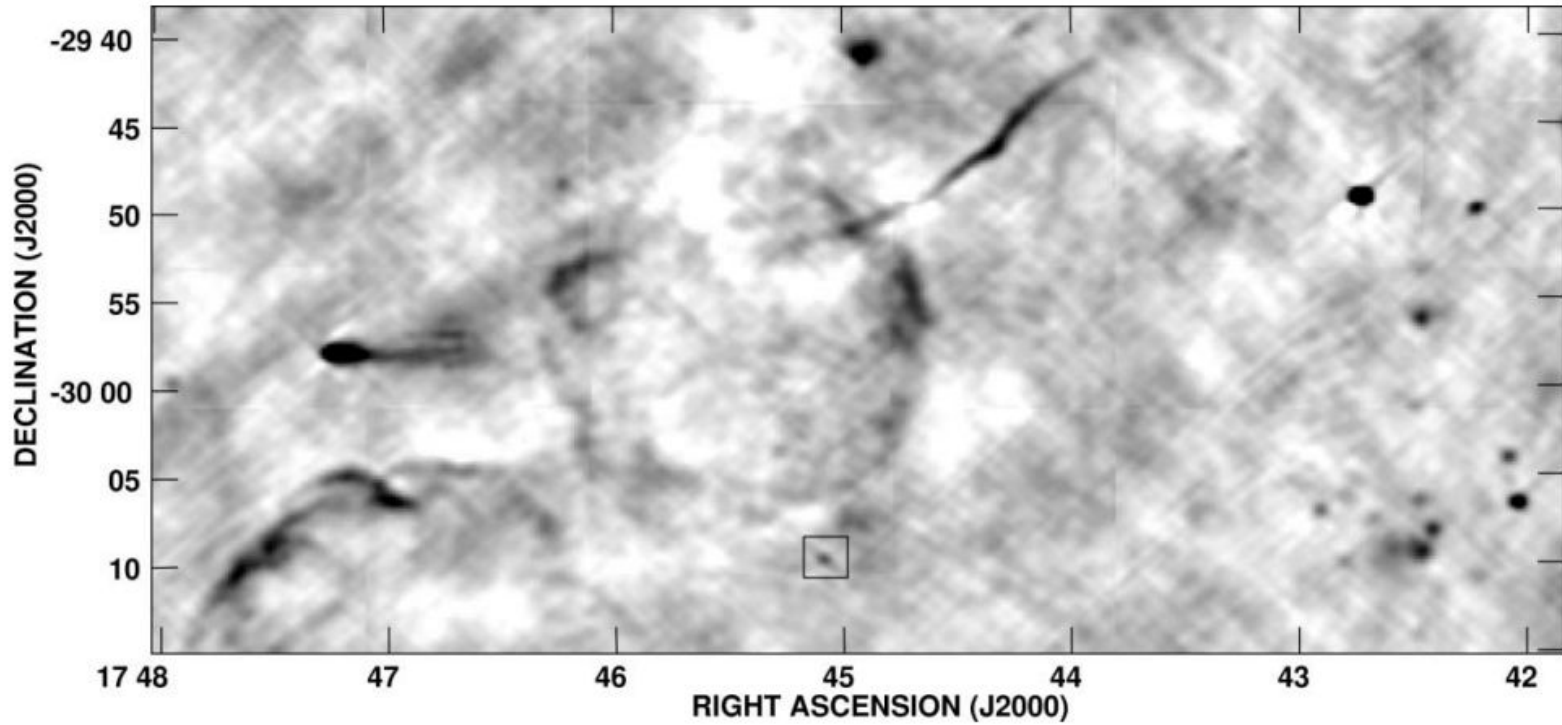


Diffuse transients!

We don't know
what this is,
but it's not in
NVSS!
~20 mJy in
RACS



Other transients



Hyman et al. 2002



Wide range of science from spending a lot of time on Galactic Plane

LOFAR cannot do this because of sky access,
SKA will not compete in angular resolution