Searching for pulsars at high radio frequencies in the Galactic Center

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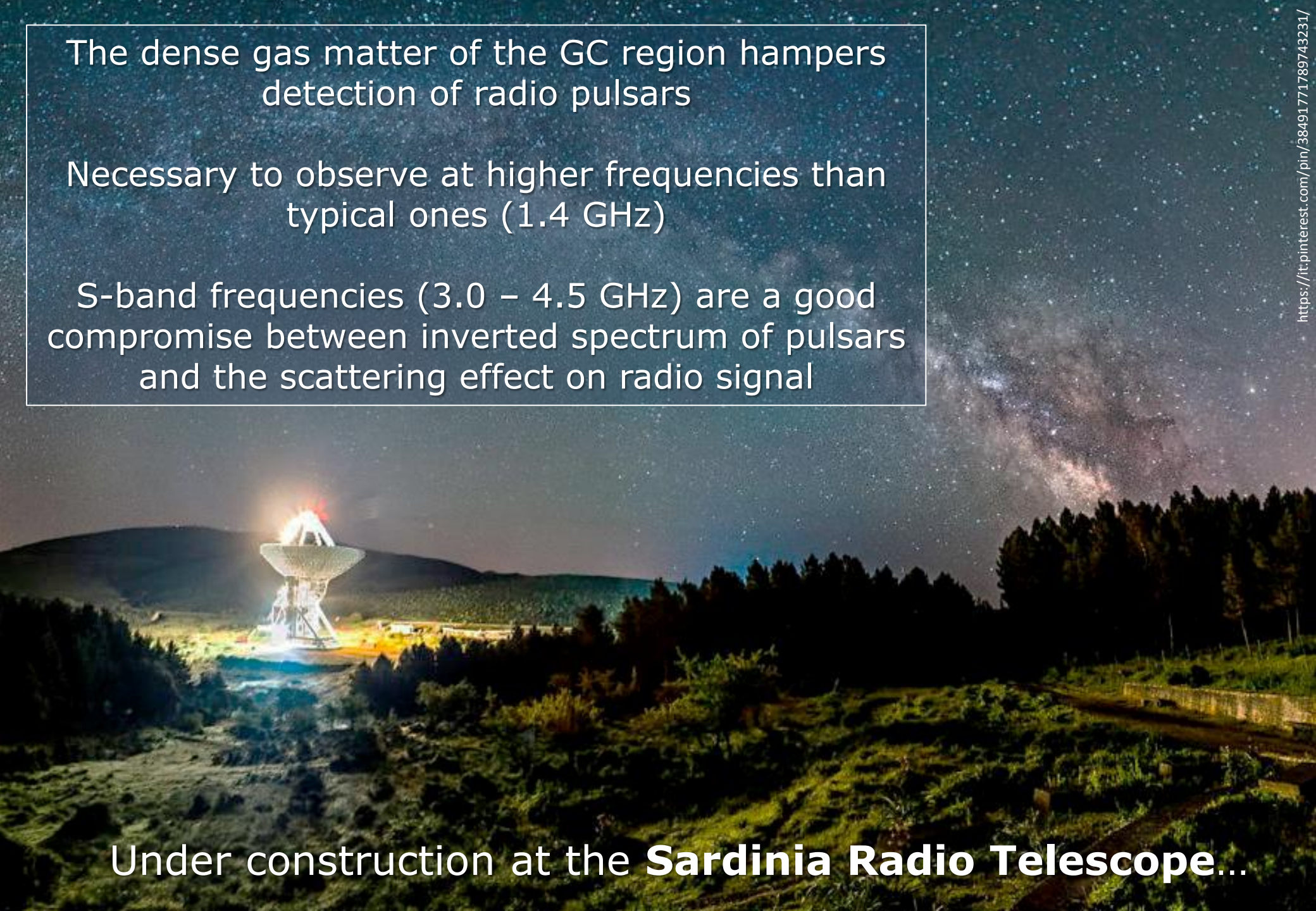
Credits: Sergio Poppi

The dense gas matter of the GC region hampers detection of radio pulsars

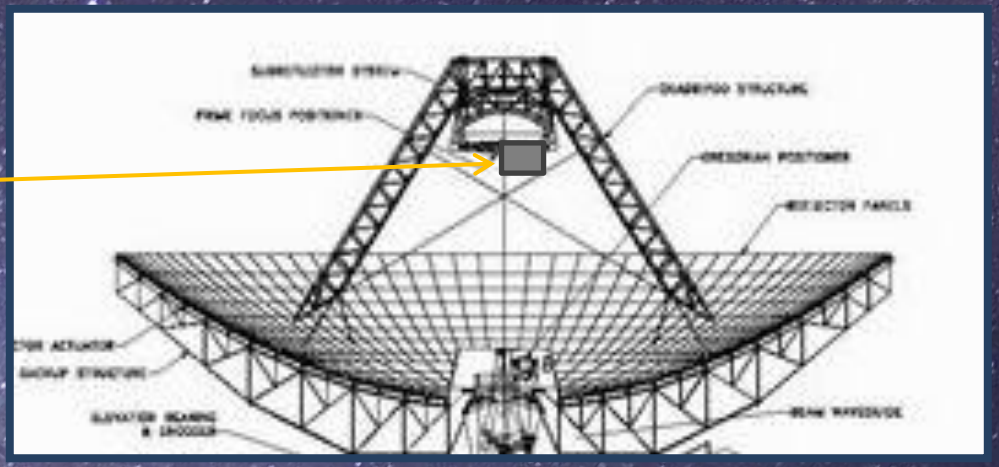
Necessary to observe at higher frequencies than typical ones (1.4 GHz)

S-band frequencies (3.0 – 4.5 GHz) are a good compromise between inverted spectrum of pulsars and the scattering effect on radio signal



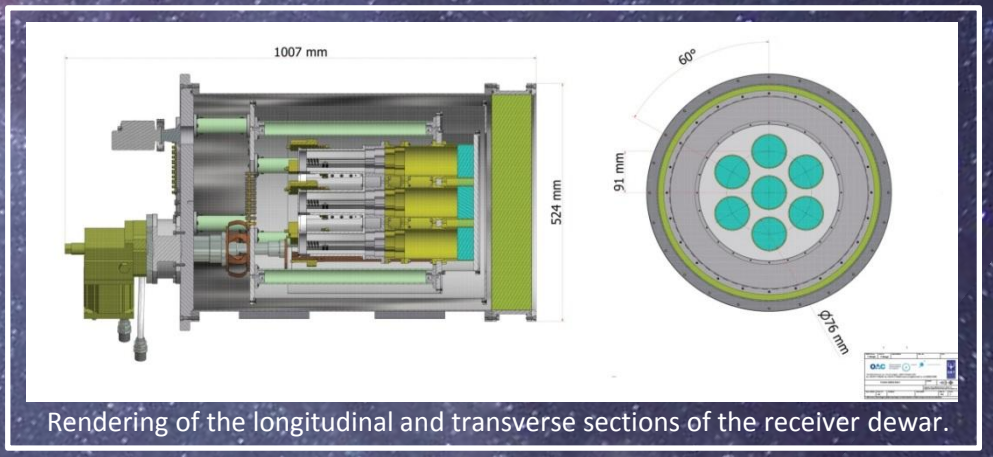
Under construction at the **Sardinia Radio Telescope**…

The S-band Receiver at SRT



S-band receiver specifications	
Number of Beams	7
Frequency Band (GHz)	3.0-4.5
Polarization	Linear
Derotator angle	±60°

SARDARA backend specifications 7 workstations (WS)	
N. of ROACH2 Boards	1 x 7 WS
N. of NVIDIA GPU (GTX980)	2 x 7 WS
N. of 8-core CPU	4 x 7 WS
Min t_{sampl} (μs)	50
Max N. of freq channels	4096



Rendering of the longitudinal and transverse sections of the receiver dewar.

Operative by the end of 2016 - configured as a 7-feed receiver
Larger "Field of View" at S-band ever

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The S-band pulsar survey

- It will span the Galactic longitudes visible by SRT and latitudes <|1°|.
- Deep survey, possibility of detecting millisecond pulsars in extremely tight orbits.

Science at S-band with SRT

Other planned scientific projects:

- GW detection: evaluate DM corrections to improve the precision of Pulsar Timing Arrays
- Understand the origin of cosmic rays, through SNR imaging
- Studying intracluster and intergalactic magnetic fields

The C-band Pulsar Survey at SRT as a pathfinder

The first pulsar survey at SRT

C-band survey parameters	
Survey area	0.5°x0.5° around the GC
Central frequency	6900 MHz
Bandwidth	924 MHz
Channel width	2 MHz
Sampling time	100 μs
Int. Time x pointing	1.5 hr

SRT Sardinia Radio Telescope

Early Science Program FEB 2016

ID	Project Name	PI
S0008	Searching for pulsars at high frequency in the Galactic Center region	Maria Noemi Iacolina

Sergio Poppi