

AUTHORS

Silvia Mantovanini
N. Hurley-Walker
G. E. Anderson

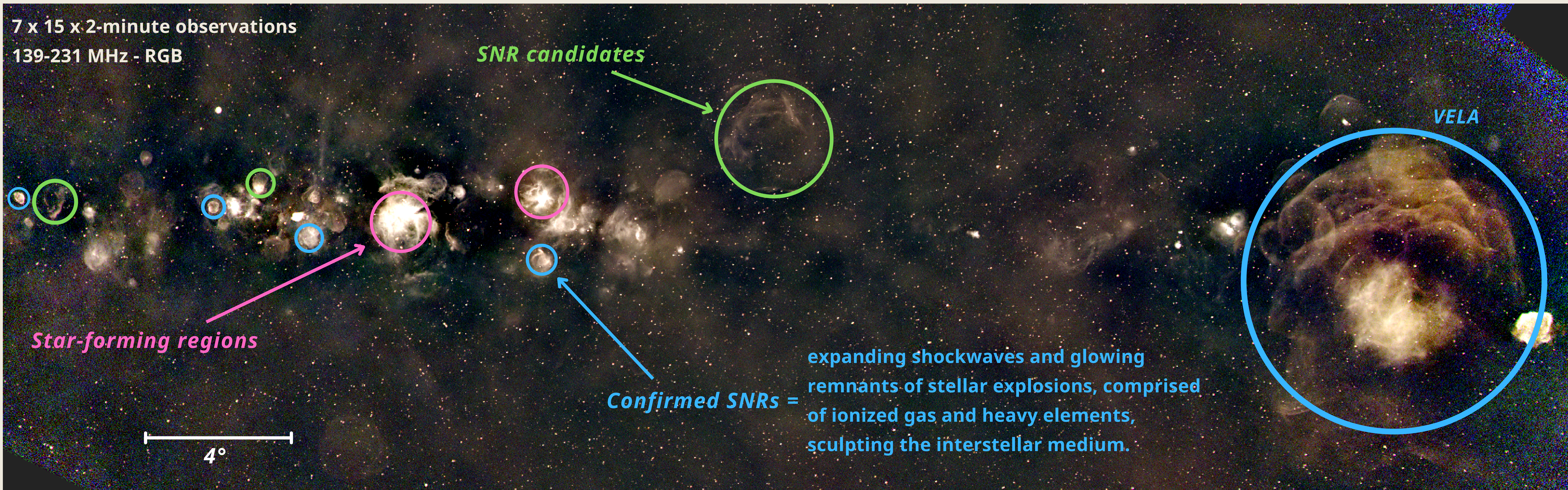
silvia.mantovanini@postgrad.curtin.edu.au

Low radio frequency images of the southern Galactic plane for supernova remnant detection

AFFILIATIONS



7 x 15 x 2-minute observations
139-231 MHz - RGB



SNR candidates

Star-forming regions

Confirmed SNRs =

expanding shockwaves and glowing remnants of stellar explosions, comprised of ionized gas and heavy elements, sculpting the interstellar medium.

VELA

01. Introduction

A gap of ~700 supernova remnants (SNRs) exists between theoretical and observed numbers in the Galactic plane [I], attributed to sensitivity limitations in current radio surveys. Larger and fainter SNRs are effectively “resolved out”, while lower-resolution techniques struggle to identify smaller SNRs.

Murchison Widefield Array (MWA: SKA precursor in Western Australia)



02. Objective

Image characteristics we want to achieve:
1. high resolution
2. sensitivity to all spatial scales (45"– 15°)
How: short-baseline survey (for large-scale structures)
+ long-baseline survey (for smaller scales).

03. Methodology

Joint deconvolution of GLEAM (Galactic and Extragalactic All-sky MWA [II]) and GLEAM-X (GLEAM-eXtended [III]) observations using the Image Domain Gridding [IV]: new fast gridded that makes w -term correction and a -term correction computationally very cheap.

Related literature

- [I] Tammann et al. 1994
- [II] Wayth et al. 2015
- [III] Hurley-Walker et al. 2022b
- [IV] Van der Tol et al. 2018
- [V] Mantovanini et al. in prep.

04. Results/Findings

1. Image of the Galactic plane at low radio frequencies: **72 – 230 MHz**
2. **21** candidates were found using similar data in [V], highlighting the potential for this research to improve SNR detection significantly.
3. **~2000 sq deg** of the Southern Galactic plane with $|b| < 5^\circ$ and $230^\circ < l < 50^\circ$
4. RMS noise varying from **10 to 2 mJy/beam** across the observing band