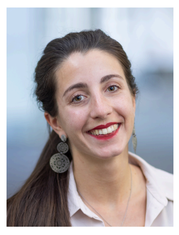
LOW RADIO FREQUENCY IMAGES OF THE SOUTHERN GALACTIC PLANE FOR SUPERNOVA REMNANT DETECTION



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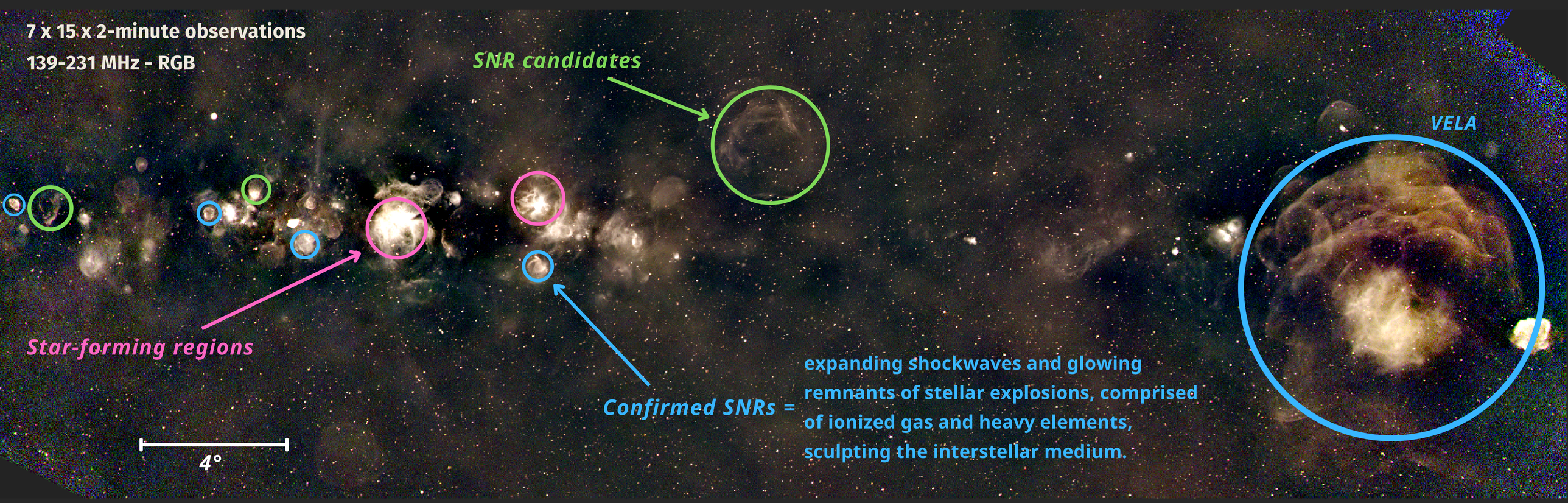
INTRODUCTION

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.



OBJECTIVE

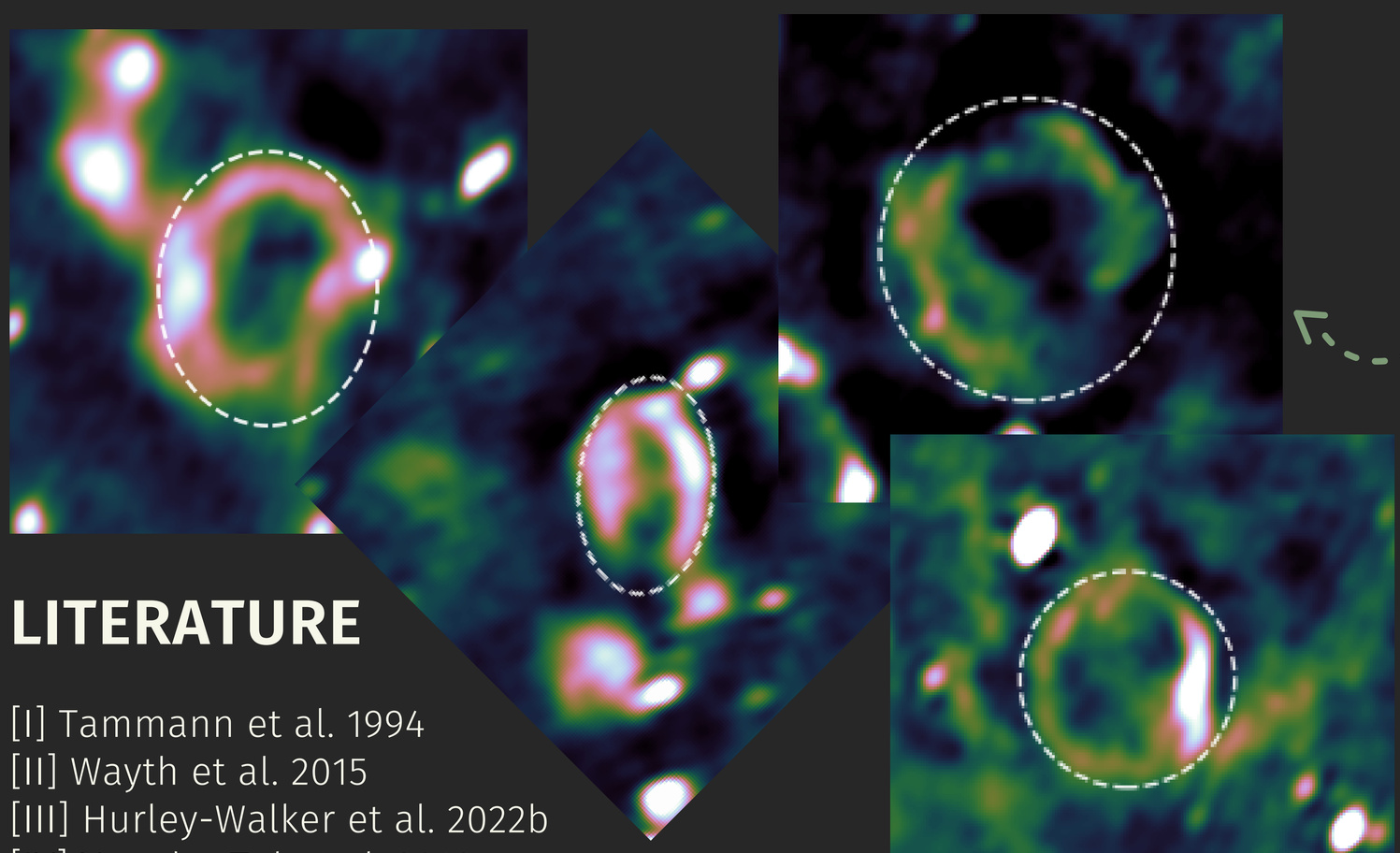
Image characteristics we want to achieve:

- high resolution
- sensitivity to all spatial scales (**45’’– 15°**)

How: short-baseline survey (for large-scale structures)
+ long-baseline survey (for smaller scales).

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 gridder that makes w-term correction and a-term correction computationally very cheap.



RESULTS & DISCUSSION

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

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