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Investigating the obscured core of the Vela Supercluster with MeerKAT

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The Vela supercluster (VSCL) is an extended and massive supercluster located at l ˜ 275°±15°; |b| < 10°, and cz ˜ 18000 km s-1. Its location is of particular interest in view of its proximity to the apex, where residual bulk flows suggest a considerable surplus of mass. However, a major fraction of its extent has little data below Galactic latitudes of |b| < 7–8° because of the obscuration by the Milky Way Plane.

The long wavelength from HI emission is the only tool that allows us to systematically probe this obscured region. We leverage the greatly enhanced sensitivity and angular resolution of the SKA precursor, MeerKAT, to map gas-rich galaxies within the inner structure of VSCL, out to cz ˜ 25500 km s-1 (z ˜ 0.085). This encompasses two complementary HI surveys at 260° < l < 290°, -2° < b < 1°; and 263° < l < 284°, |b| < 6.7°, sensitive to normal spiral galaxies at the VSCL distance over ˜300 deg2.

More than 1500 heavily obscured galaxies were discovered within the Vela volume, most of which were newly identified. Roughly 800 were located within the deepest extinction layers, and ˜700 were situated above and below the Galactic Plane. We found indications of the core that revealed two overdense, wall-like structures that align with the walls identified at higher latitudes by Kraan-Korteweg et al. (2017). They also are consistent with predictions from recent independent velocity field reconstructions. With adequate photometry, the data quality and statistics are sufficient to potentially determine peculiar velocities.

Author: RAJOHNSON, Sambatriniaina (Department of Astronomy, University of Cape Town; INAF - Osservatorio Astronomico di Cagliari.)

Co-authors: Prof. KRAAN-KORTEWEG, Renée (Department of Astronomy, University of Cape Town); Prof. STAVELEY-SMITH, Lister (International Centre for Radio Astronomy Research (ICRAR), University of Western Australia); Dr FRANK, Bradley (UK Astronomy Technology Centre, Royal Observatory Edinburgh)

Presenter: RAJOHNSON, Sambatriniaina (Department of Astronomy, University of Cape Town; INAF - Osservatorio Astronomico di Cagliari.)

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