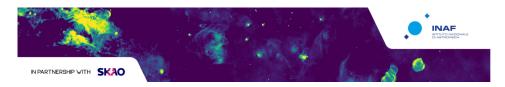
The Fifth National Workshop on the SKA Project



Contribution ID: 93 Type: not specified

SHORES: Multi-frequency exploration of the faint radio sky

Tuesday 25 November 2025 14:39 (3 minutes)

We introduced the Serendipitous H-ATLAS-fields Observations of Radio Extragalactic Sources (SHORES) survey, which targeted 29 fields in total intensity and polarisation within the Herschel-ATLAS Southern Galactic Field. Observations were performed with the Australia Telescope Compact Array in the 2 GHz band, with a central frequency of 2.1 GHz and 2 GHz total bandwidth. Two fields (Deep-1 and Deep-2) were observed to greater depth, while the remaining 27 shallower fields cover ~26 deg², reaching a typical rms of $\sigma \boxtimes 33$ µJy in the central regions. The Deep-1 field reaches $\sigma \sim 9$ µJy/beam, and Deep-2 ~ 18 µJy/beam, with a combined coverage of ~1 deg² at a mean sensitivity of ~13 µJy/beam. Follow-up mosaics at 5.5, 7.25 and 9 GHz reach rms values of 28–39 µJy.

In the shallow component, 2294 sources were detected, with 95% completeness at 497 μ Jy and reliable counts down to 150 μ Jy. Thanks to the 6-km ATCA E-W configuration, we achieved angular resolutions of 3.2 \times 7.2 arcsec, with 81% of sources remaining unresolved.

In the deep fields, we extracted 489 sources at 2.1 GHz, of which ~100 are also detected at 5.5–9 GHz. Reliability reaches 95% at SNR ~5, while completeness at 95% corresponds to 182 μ Jy (DEEP-1) and 198 μ Jy (DEEP-2). The spectral index distribution peaks at $\langle \alpha \rangle \approx -0.7$ with $\sigma \approx 0.3$, dominated by flat-to-steep spectrum sources, while peaked-spectrum sources account for ~16%. About 20% of detections lack FIR counterparts and typically show steep spectra, consistent with a population of FIR-dark galaxies at z > 3. Among sources with H-ATLAS counterparts (~19%), most exhibit qFIR > 1.7 and spectral indices typical of star-forming galaxies, indicating that star formation dominates below the mJy level.

Euclidean-normalised differential source counts were derived at 2.1 and 5.5 GHz. At 2.1 GHz, we confirm the transition from AGN to SFG dominance below \sim 0.5 mJy, in agreement with models such as Mancuso et al. (2017). The 5.5–9 GHz counts provide the first direct constraints on the sub-mJy sky at these frequencies, showing an indication of flattening below \sim 0.3 mJy.

These results demonstrate the value of deep, multi-frequency radio observations in well-characterised extragalactic fields. SHORES bridges the gap between wide-area shallow surveys and ultra-deep pencil-beam fields, offering new constraints on the relative contributions of star formation and AGN activity in preparation for SKA pathfinders and SKA surveys.

Topics

Galaxy Evolution & AGN

Author: BEHIRI, Meriem (Istituto Nazionale di Astrofisica (INAF))

Co-authors: LAPI, Andrea (SISSA); MASSARDI, Marcella (Istituto Nazionale di Astrofisica (INAF)); GIULI-ETTI, Marika (Istituto Nazionale di Astrofisica (INAF)); GALLUZZI, Vincenzo (Istituto Nazionale di Astrofisica (INAF))

Presenter: BEHIRI, Meriem (Istituto Nazionale di Astrofisica (INAF))

Session Classification: Flash talks