

MeerKAT open time call 3 December - Proposal summary

| Observing X-shaped Radio Galaxies with MeerKAT | |
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| Proposal number 19 | Thu Jan 31 2019 11:09:16 GMT+0200 (SAST) |
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Abstract:

X-shaped radio-galaxies (XRGs) are a rare morphological subset of radio galaxies, showing two pairs of lobes, but generally a single pair of jets. This morphology hints at their origin through either hydrodynamical scenarios (where the X-shape is produced through interactions with the local ambient medium), or through a change in the spin of the supermassive black-hole (SMBH) powering the radio jets (via the mergers of SMBHs). XRGs are therefore prime candidates for estimating: the gravitational-wave background component by merging SMBHs, the impact of galaxy mergers on radio-mode feedback processes, and the interactions of radio sources with their environs. Current studies of these objects are not conclusive in favouring a single formation theory. Measurements of spectral-index variation across the source, and detection of key signatures such as precessing jets, are central to differentiating between the competing scenarios. Another issue is the sparsity of XRG samples, which crucially require low surface-brightness sensitivity for detection. To this end, we propose a pilot study of six nearby XRGs with MeerKAT, which forms the first part of a planned larger survey of XRGs in the Southern hemisphere. Based on our simulations, the proposed observations will be a factor 5 more sensitive than those used for previous studies. This enables the generation of high-resolution spectral-index maps and the detection of hitherto-unseen morphological features, ultimately providing vital clues as to the formation of XRGs. These observations will also provide an ideal testbed for novel techniques such as tomography, super-resolution imaging, and baseline-dependent averaging.

Observation parameters:

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|-------------------|--|---------------------------|-----|
| Targets | 1. Name: B2014-558 RA: 20:18:02 DEC:-55:39:30, 2. Name:GLEAM J112554-352321, RA: 11:25:54, DEC: -35:23:22, 3. Name: 3C 403, RA: 19:52:15, DEC: 02:30:24, 4. Name: 4C 12.03, RA: 00:09:52, DEC:12:44:05, 5. Name: 3C76.1, RA:03:03:15, DEC:16:26:19, 5. Name: J1101+1640, RA: 11:01:51, DEC: 16:40:40 | | |
| Total time | 16 in 12 epochs | Dump rate | 8 s |
| Daytime | Nighttime preferred | Variable/Transient | No |
| Baselines | No more than one of the nine 'outer ring' antennas may be excluded from the array | | |

List of files uploaded. Files in order of upload. Usually just revising their proposal, so click the last one, but some people attached several different files, so they may all be useful.

<https://drive.google.com/open?id=1TkShAQlrHlq0v681czjhO89EaYNTGevv> .

File comments: