

# Cold atomic gas in strong X-ray cool cores of local galaxy groups

## Abstract

While AGN feedback has emerged as a key ingredient in galaxy formation and suppressing cooling in X-ray cool cores, heating cannot stop cooling at all times and all spatial scales. Indeed, star formation and multi-phase warm/cold medium are still common in X-ray cool cores around the central galaxies. Despite the recent advances, there is little information on the cold atomic gas (e.g., HI) in X-ray cool cores. We suggest it is the combination of the typical strong radio continuum and the expected faint HI flux from the source distance and limited sensitivity of existing HI telescopes. MeerKAT, being  $\sim 2.5$  times more sensitive than VLA on nearby HI emission, provides a great opportunity to re-visit this problem, also because of its great uv coverage. We select a sample of four nearby early-type galaxies at the center of strong X-ray cool cores, all with extended H $\alpha$  nebulae and not associated with strong radio AGN, to search for HI emission in local X-ray cool cores. This proposal may provide the first detection of HI emission in X-ray cool cores. Even non-detections will provide the strongest upper limits on HI emission in cool cores. The data can also be used to study the particular phase of AGN feedback in these galaxies and study the HI content and radio AGN of other group galaxies.