

Title

MeerKAT follow up of ASKAP Dark Galaxies

Abstract

Dark galaxies are defined as isolated, dark matter dominated systems without optical counterparts. While they are devoid of stars, those that are sufficiently gas-rich might be detected by radio telescopes. They have been predicted to have a primordial origin by both theory and simulations, and could help resolve cosmological tensions such as the missing satellites problem. Despite many HI surveys, no confirmed dark galaxies have been found to date. With new large area, high resolution HI surveys such as the Widefield ASKAP L-band Legacy All-sky Survey (WALLABY), we have the potential to confirm the existence of dark galaxies. Here, we propose to observe 28 dark galaxy candidates found in the WALLABY pilot survey. Not only will MeerKAT allow us to confirm the detections, the deeper sensitivity will recover more diffuse gas that will help us to distinguish between an interaction-based and a primordial origin, and the improved resolution will allow us to make kinematic models that will probe the dark matter content. Studying dark galaxies and clouds can give us insights into factors that suppress star formation in galaxy evolution. Confirmation of the WALLABY dark galaxy candidates with MeerKAT will provide insight into the optically dark Universe in the upcoming Square Kilometre Array era.