

Title

MeerKAT search for the atomic hydrogen counterpart to the extended FUV emission in NGC 7293

Abstract

Planetary nebulae (PNe) are important targets for understanding the history of stellar winds and the lifecycle of materials in a galaxy. However, the "PN missing mass problem" and how PNe interact with the interstellar medium (ISM) have long puzzled astronomers. In the past, the total mass of atomic hydrogen (H I) in the circumstellar envelope (CSE), which constitutes a significant portion of the total mass of the nebula, has not been well studied due to interference from galactic H I emission. The extended, nearby PN NGC 7293 is an ideal target for studying the total H I mass of PN and how the PN interacts with the ISM. NGC 7293 is known to have H I emission and extended FUV radiation. However, a past study using the VLA-DnC configuration with a field of view of only 15' was unable to fully sample the H I in the approximately 45' FUV region. Consequently, this work did not provide a comprehensive understanding of the total H I in NGC 7293. In this proposal, we suggest using MeerKAT to map the H I of NGC 7293 to gain a comprehensive understanding of its H I distribution. This extended H I is crucial for understanding the "PN missing mass problem," mass loss history, and the kinematics of the H I in the outermost regions.