

Technical Page

Proposal Type: Regular
 General Category: Astronomy
 Sub-Category: Spectroscopy
 Observation Category: Extragalactic
 Total Time Requested: 52 Hours
 Minimum Useful Time: 1 hour

Proposal Title: The Faint Disk and Clouds in the Outskirts of M33

ABSTRACT:

We propose to use the ALFA array to map, in the 21-cm line, two fields around the Local Group galaxy M33, the largest galaxy in angular extent observable at Arecibo. We will reach a sensitivity of about 10^{18} atoms per sq. cm or 10^4 Msun (!), at a resolution of 1-2 km/s, that is a substantial improvement respect to any previous search with comparable spectral and spatial resolution. The selected region is 5 square deg. and extends from the outer disk out to a projected radius of 55 kpc. The HI data will provide unique information on topics of cosmological importance: i) the presence of infalling gas clouds and of dark satellites, that is compact HI clouds with an associated dwarf dark-matter halo; ii) the position and structure of the outer edge of the HI disk and thus the intensity and relevance of the extragalactic ionizing background radiation; iii) the outermost disk warp, together with the density structure of the M33 dark-matter halo beyond 15 disk scalelengths (20 kpc) and its possible connection with M31. The proximity of M33, and the availability of a sensitive L-band array, provide therefore a rare opportunity to probe the nature of dark matter by unveiling its distribution at very large galactocentric distances and by testing in the Local Universe scenarios of continuing galaxy formation through infall and merging.

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Remote Observing Request

- Observer will travel to AO
- Remote Observing
- In Absentia (instructions to operator)

Instrument Setup

ALFA

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned