Section I - General Information

Submitted for Feb 1 2008.

This proposal has not been submitted before.

Proposal Type: Commensal
General Category: Astronomy
Sub-Category: Continuum
Observation Category: Galactic
Total Time Requested: 326.2 Hours
Minimum Useful Time:
Expected Data Storage: 100-500 GB

Proposal Title: GALFACTS Commensal Observing with I-GALFA

ABSTRACT:

The GALFACTS consortium proposes to observe commensally with the I-GALFA survey (A2186). The inner Galaxy is the most important region for GALFACTS galactic disk science. While they will not replace the GALFACTS coverage of this region, the commensal observations with I-GALFA will allow the GALFACTS consortium to advance major science objectives related to astrophysics of the magnetic field in the disk in a timely fashion. The polarimetric observations will also complement the I-GALFA HI images to allow study of the relationship between magnetic fields and the cold neutral ISM using these two Arecibo data sets. The GALFACTS data pipeline has been developed over the past two years using small pilot projects. With sufficient calibration observations in advance of the I-GALFA observations, we expect to be able to very rapidly turn the commensal observations into final scientific images for distribution to the GALFACTS consortium.

Name | Institution | E-mail | Phone | Student
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Additional Authors

Tapasi Gosh (NAIC) | plus the remaining GALFACTS Consortium (27 additional researchers).
Steven Gibson (NAIC)

I will not need financial support.

This work is part of a PhD thesis.
Remote Observing Request

Observer will travel to AO

Remote Observing

In Absentia (instructions to operator)

Section II - Time Request

The following times are in AST.

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<th>Begin – End Interval–Interval</th>
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Time Constraints (Must Be Justified in the Proposal Text)

This is a commensal request. All these parameters are as for I-GALFA.

Section III - Instruments Needed

ALFA

Atmospheric Observation Instruments:

Special Equipment or setup: none

Section IV - RFI Considerations

Frequency Ranges Planned

1270 - 1570

This proposal requires coordination with Punta Salinas radar within the band 1222-1381 MHz.

This proposal requires coordination with GPS L3 at 1381 MHz.

Section V - Observing List
Target List

Commensal with I-GALFA survey
The GALFACTS consortium proposes to observe commensally with the I-GALFA survey (A2186). The inner Galaxy is the most important region for GALFACTS galactic disk science. While they will not replace the GALFACTS coverage of this region, the commensal observations with I-GALFA will allow the GALFACTS consortium to advance major science objectives related to astrophysics of the magnetic field in the disk in a timely fashion. The polarimetric observations will also complement the I-GALFA Hi images to allow study of the relationship between magnetic fields and the cold neutral ISM using these Arecibo data sets.

As an illustration of the importance of the inner Galaxy region for studies of Galactic magnetism, Figure 1 shows the Arecibo coverage of the plane of the Galaxy relative to the two interferometric polarization surveys (the CGPS and SGPS). The circles around the picture at left shows the average Faraday Rotation Measure (RM) as a function of longitude for the longitude intervals covered by the CGPS and SGPS. Filled circles indicate positive RM and open circles negative. The size of the circle scales with the magnitude of the RM. Highly structured and systematic variations in RM with longitude are seen that relate to the spiral structure of the Galaxy. The important inner Galaxy region is missing, and will be largely filled in with the GALFACTS commensal observations of I-GALFA. The GALFACTS commensal observations will yield an area density of background RM measurements several times higher than the CGPS. Thus one of the immediate science outcomes will be a nearly complete set of data on the global magnetic field structure over the entire Galaxy and on the smaller-scale “turbulent” structures in the inner galaxy, where energy injection from the products of massive star formation is high.

GALFACTS and I-GALFA are natural commensal partners. I-GALFA uses the same fast meridian scanning observing mode that will be used for GALFACTS, albeit at a different scan speed. We carried out a pilot project in commensal mode with the GALFA HI observations in A2174. These observations were very successful and were used to refine the GALFACTS data processing pipeline. With sufficient calibration observations in advance of the I-GALFA observations, we expect to be able to very rapidly turn the commensal observations in to final scientific images for distribution to the GALFACTS consortium.

The GALFACTS project has been awaiting the completion of the pdev spectrometer installation to begin the survey. We look forward to this opportunity to begin observations.