Proposal Identification No.: P2779 Date Received: 2012-Aug-31_17:19:29

Arecibo Observatory

William E. Gordon Telescope

Observing Time Request

COVER SHEET

Section I - General Information

Submitted for Sep 1 2012.

This proposal has not been submitted before.

Proposal Type:	Regular
General Category:	Pulsars
Observation Category:	Extragalactic
Time Requested this semester:	17
Hours already used for this project:	0
Additional Hours required to complete project:	
Minimum Useful Time:	1.25 hr
Expected Data Storage:	100-500 GB

Proposal Title: Low-frequency PUPPI Search for Pulsars and Transients in M33

ABSTRACT:

We propose to use the 327 MHz receiver and PUPPI backend to search for Crab-like pulsars in M33. These would be the first detections of extragalactic pulsars beyond the Magellanic Clouds. Crab-like pulses from M33 would help us understand neutron star formation, the supernova process, the M33 pulsar population, and pulsar evolution at early stages in this galaxy. They would also probe the poorly understood intergalactic medium and the interstellar medium of M33. Extremely luminous pulsars, rotating radio transients (RRATs), magnetars emitting bright radio bursts, and exotic bursts from other kinds of Galactic or extragalactic sources may also be detectable. With the PUPPI backend, every Crab-like emitter beaming toward us from M33 should be detectable in this search, with one pulse detected from each source every 2 to 3 min of integration. Scattering, scintillation, and dispersion are not expected to be significant. Our total time request is 17 hr.

Outreach Abstract:

Radio pulsars are wonderful tools for studying physics in a variety of ways. However, almost all pulsars discovered to date lie within our own Galaxy. Finding pulsars in other galaxies is very difficult owing to the large distances to such objects. We are proposing a new search for pulsars in the spiral galaxy, M33 (the Triangulum Galaxy). Discovery of pulsar signals from M33 would allow us to study the evolution and population of pulsars in another spiral galaxy and would let us probe the ionized material between us and M33. With our observations, we hope to detect extremely bright bursts of radio waves from pulsars in M33, which are more easily detectable at very large distances than steady pulsed emission.

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This work is not part of a thesis.

Remote Observing Request

[X]	Observer will travel to AO
[ ]	Remote Observing
[ ]	In Absentia (instructions to operator)

Section II - Time Request

The following times are in LST.

For these observations night-time is not needed.

Begin – End Interval–Interval	Days Needed at This Interval
00:10 – 02:30	7
00:10 – 01:30	1
–	
–	

Time Constraints (Must Be Justified in the Proposal Text)

Prefer a contiguous 8-day block if possible since we are planning (hoping) to do the observations on site during one trip.

Preferred dates (from academic calendar commitments and travel needs):

Jan 2 through Jan 11

After May 12

Section III - Instruments Needed

327

Atmospheric Observation Instruments:

Special Equipment or setup: PUPPI with 100 MHz and 4096 chans in search mode.

Section IV - RFI Considerations

Frequency Ranges Planned

302 - 352

Section V - Observing List

Target List

Object RA Dec LST rise LST set
M33 01:34:00.0 30:40:00.0 00:27:10 02:42:21