Proposal Identification No.: P2779 Date Received: 2013-Feb-26_16:36:29

Arecibo Observatory

William E. Gordon Telescope

Observing Time Request

COVER SHEET

Section I - General Information

Submitted for Mar 1 2013.

This proposal has been submitted before.

The previous proposal number is P2779.

Proposal Type:	Regular
General Category:	Pulsars
Observation Category:	Extragalactic
Time Requested this semester:	17
Hours Next Semester:	0
Hours already used for this project:	0
Additional Hours required to complete project:	0
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 giant pulse emitting neutron stars in M33. These would be the first clear detections of extragalactic pulsars beyond the Magellanic Clouds. Pulses from Crab-like pulsars in M33 would help us understand neutron star formation, the supernova process, the M33 pulsar population, and pulsar evolution at early stages. They would also probe the poorly understood intergalactic medium and the interstellar medium of M33. Extremely luminous pulsars, rotating radio transients, magnetars emitting bright radio bursts, and other kinds of exotic bursts may also be detectable. With the PUPPI backend, every Crab-like emitter beaming toward us from the M33 optical disk should be detectable in our search, with one pulse detected from each source every 3 to 9 min of integration. Scattering, scintillation, and dispersion are not expected to be significantly detrimental in the search. Our total time request is 17 hr.

Outreach Abstract:

Radio pulsars are wonderful tools for studying physics. However, almost all pulsars discovered to date lie within our own Galaxy. Finding and studying pulsars in other galaxies is very difficult owing to the large distances to such objects. We are conducting a search for pulsars in the spiral galaxy M33 (the Triangulum Galaxy). With our observations, we hope to detect extremely bright bursts of radio waves from pulsars and other kinds of neutron stars in M33. 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 ionized intergalactic material.

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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 block of days since we are planning to come to Arecibo and do the observations on-site during one trip.

Before Aug 27 or after Dec 15 preferred owing to academic calendar commitments.

Section III - Instruments Needed

327

Atmospheric Observation Instruments:

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

Section IV - RFI Considerations

Frequency Ranges Planned

302 - 352

Section V - Observing List

Target List

M33 01:34:00.0 30:40:00.0 00:27:10 02:42:21