The South Texas Long Wavelength Array

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Thanks to the support of the LWA team, The Center for Advanced Radio Astronomy at UT Brownsville is building

"The South Texas Long Wavelength Array"

Special thanks to Tim Hankins
and to
Namir Kassim and Greg Taylor
as well as
Paul Ray, Joe Lazio, Robert Navarro, David Besson, Steve Ellingson, Jayce Dowell, Daniel Wood, Tracy Clarke

The South Texas Long Wavelength Array

Science Goals:

The STLWA will work together with LWA-1 to

1)Search for Radio Pulsars and Radio Transients

-Proposed joint surveys are expected to detect 600 pulsars (200 new)

-Up to 500 times more sensitive to radio transients than previously published surveys.

2)Perform rapid response followups of LIGO based triggers.

3)Study cosmic ray showers and lightening events.

4)Develop radio frequency interference and mitigations techniques.

Education/Outreach Goals:

1)Train students at the high school, undergraduate and graduate levels in the tools of modern astronomy.

2)Enhance the recruitment of students into STEM careers.

ARCC: Arecibo Remote Command Center

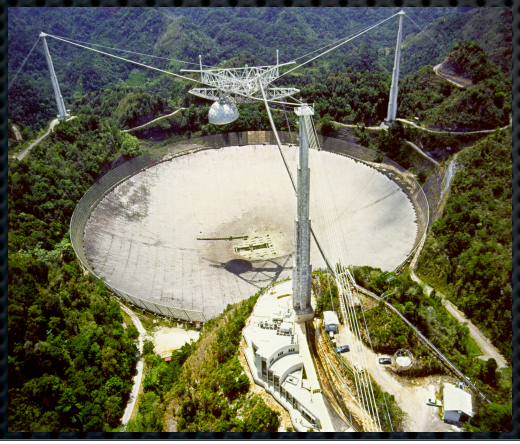
- An integrated Research, Education, Outreach program designed to attract talented students into STEM Careers.
- High school, Undergraduate, and Graduate students work in teams to control the world's largest radio telescope as well as other major astronomical facilities around the world.

The ARCC room

- Making science look on the outside the way it feels on the inside.

A fully operational Command Center

Students take full control of the Arecibo or Green bank radio telescopes during their observations.



Program Highlights

- 15 Undergraduates currently involved in the ARCC Scholars/Tyro Program (Funded by NSF PAARE)
- Taken as a department, ARCC is projected to be tenth in the nation for graduating minority students with degrees in phyiscs.
- Over 100 High School Students have directly controlled the Arecibo Radio Observatory.
- We typically have 20 high school students involved in the program each year.

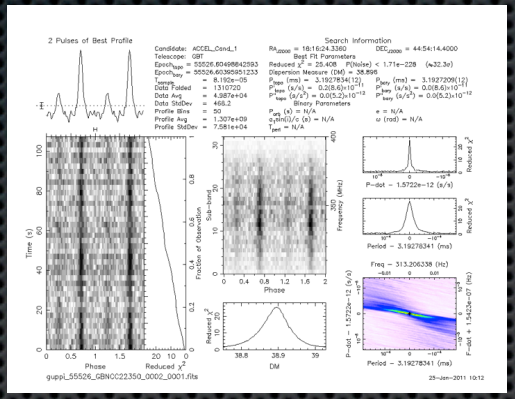
Scientific Highlights of the ARCC program

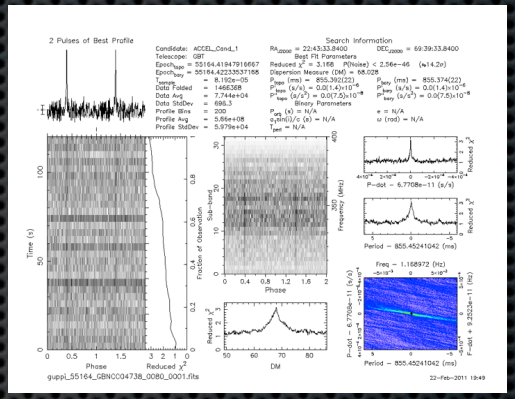
- Discovered 6 radio pulsars.
  - Students are performing followup observations of these sources to determine their physical properties.
- Discovered evidence for “Faster-Than-Light” pulse propagation in interstellar space
  - A new tool study the interstellar medium
  - Students performing followup observations to confirm and further study this effect.

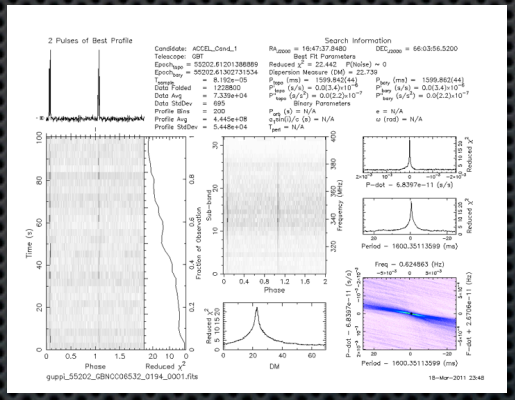
ARCC Pulsar Discoveries

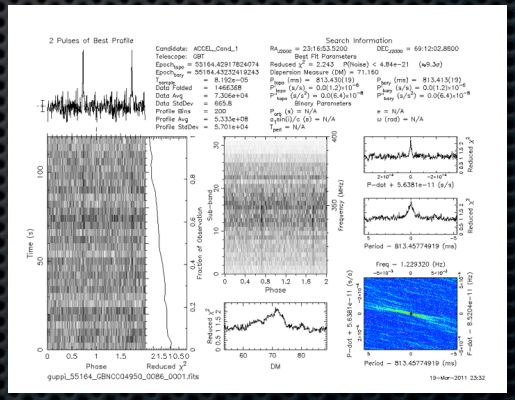
Name	Period (ms)
J1816+45	3.19
J2243+69	855
J1647+66	1599
J2316+69	813
J1921+42	595
J0216+52	24.5

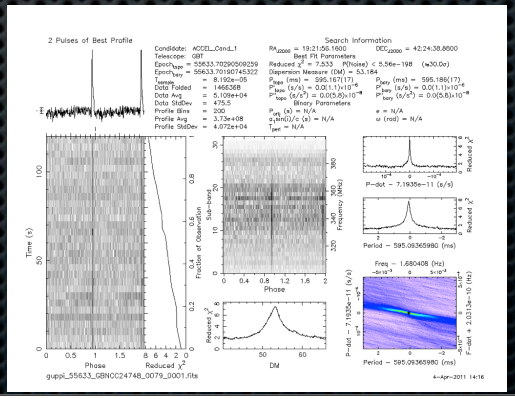
All pulsars discovered by ARCC students using web-based candidate evaluation software written by graduate student Kevin Stovall. Candidates were pre-sorted by automated evaluation software developed by graduate student KJ Lee.

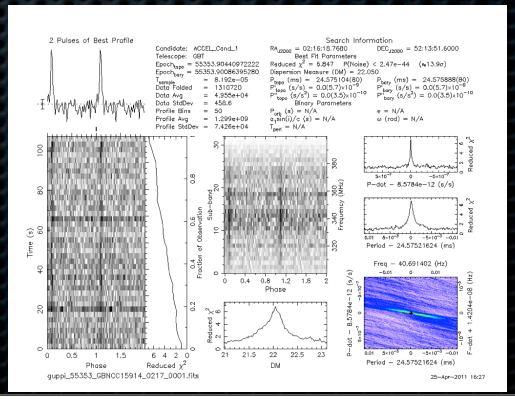




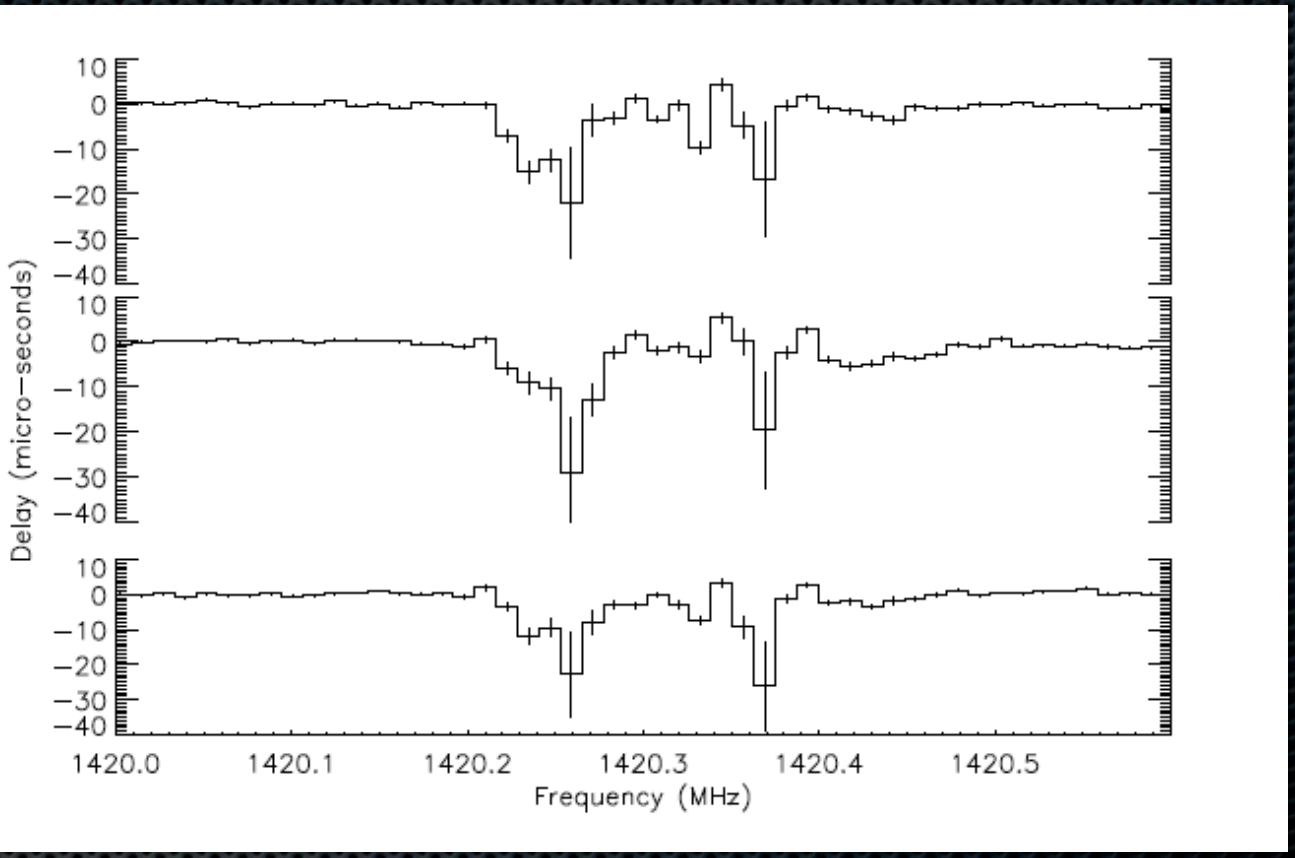








ARCC students measure the pulse arrival time advances due to the presence of the HI resonance. This is the first time this phenomenon has been seen in an astrophysical setting.



Average pulse arival time vs frequency taken at three different epochs. Standard dispersion delays are removed. Near the HI resonance, the pulse arrival times deviate from the standard cold plasma dispersion relationship.

- Radio astronomy is proving to be an effective tool to attract students into STEM related careers.
- The STLWA is the logical next step in the evolution of the ARCC program. It provides an instrumental component to the opportunities available.
- The STLWA will be built by the ARCC students together will local high school students.
- The LWA based pulsar, radio transient, and rapid response followup programs fit in naturally with the research programs already in place in ARCC.
- The ARCC students are excited about the prospect of working with the LWA project.