



The ALFALFA Undergraduate Workshop: Promoting Undergraduate Participation in a Legacy Survey Project

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Abstract

Undergraduate participation is a desirable but often challenging goal for legacy-style projects that occur over long time scales and involve large collaborations. The ALFALFA (Arecibo Legacy Fast ALFA) project, which is surveying 7000 square degrees of the Arecibo extragalactic sky in the 21 cm HI line, includes a working group on the effective involvement of undergraduates in ALFALFA research projects. As part of this work, the 'First ALFALFA Undergraduate Workshop' was held July 6 and 7, 2005, at Union College in Schenectady, New York. The workshop provided lectures at the undergraduate level covering the science background and technical details of the project to 25 participants, including 13 undergraduates involved in summer research with ALFALFA. The highlight of the workshop was a 1.5 hour remote observing session at Arecibo. Planning the observations became part of the students' summer research experience as they worked together as a team (via email) in the weeks before the workshop to construct and submit an observing proposal. Part of the second day of the workshop was devoted to reducing the data, and students continued to meet electronically after the workshop to analyze the data. Further ALFALFA observations of this field are planned for spring 2006 and several of the students are working on research and thesis projects using the ALFALFA dataset. Funding for the workshop was provided by NSF AST-0307396, NST AST-0407011, and the Brinson Foundation.

Arecibo Legacy Fast ALFA Survey

Extragalactic HI-line survey covering 7000 deg² using ALFA (Arecibo Line Feed Array) at Arecibo

For more details on survey, see other ALFALFA posters in this session.

ALFALFA/NAIC Education/Outreach Goals

- Establish educational opportunities for undergraduates, graduate students, & postdocs
- Develop educational materials for K-12, undergraduates, graduate students
- Provide information and outreach materials to the public.

Challenges for Undergraduate Participation in ALFALFA

- Multi-year project: 4000 hrs of telescope time, 5-6 years
- Collaboration of > 40 scientists
- Weak/no background preparation in radio astronomy
- Short timescale of undergraduate involvement (summer, term)
- In early years of survey, incomplete data sets

First ALFALFA Undergraduate Workshop

Goals:

To provide the Summer 2005 undergraduates lectures covering the science background and technical details, to expose them to the nature of large legacy style surveys, and to give them the opportunity to exchange their experiences with their peers

To provide the framework for exchanging materials (lecture PPT, handouts, exercises) among participants as well as others.

To provide a forum for faculty discussion of products useful for undergraduates and to confer with an expert on public outreach: J. Alonso of Angel Ramos Foundation Visitor Center at Arecibo

Before Workshop: Planning of Remote Observations

Oral request for 90 minutes of telescope time to coincide with the workshop made to NAIC Director Robert Brown early in 2005. On his (very clever) suggestion, time reserved on condition that students submit a written summary of how they would use the telescope time.

Students met electronically in weeks before workshop and decided to propose to observe a group of galaxies. In response to this general guideline, a standard ALFALFA drift scan appropriate for this goal was selected by the ALFALFA scheduler.

Students researched what group and other interesting galaxies the drift scan would cross, what other information was available and what they might expect to detect with the single pass drift scan. They decided to make the nearby group LGG362 their main object of study.

Proposal submitted to NAIC was given its own observing proposal designation (A2140).

ALFALFA: The Arecibo Legacy Fast ALFA Survey
The 2005 Summer Undergraduate Observing Program
30 June 2005

Adrienne Stilp	Cornell & U. Wisconsin ('06)
Neil Patel	Cornell ('07)
Adeel Altaf	Lafayette
John Ayala	U. Puerto Rico
Christi Forsyth	Colgate & Bryn Mawr ('07)
Michael Gillin	Union
Josh Goldstein	Lafayette
Bilal Mahmood	Union
Brendan Mullan	Colgate
Jay Read	Union
Brian Walsh	Colgate
Steph Wortel	Colgate

Abstract

The Arecibo Legacy Fast ALFA (ALFALFA) project is a blind HI survey covering 7000 deg² of the sky and is expected to detect at least 20,000 HI sources. In addition, ALFALFA will contribute to the understanding of the evolution of galaxies in relation to their environments. Following the same techniques and procedures as the general ALFALFA survey, we plan to observe a nearby loose group of galaxies, LGG 362. This group should have at least six HI sources. At the distance of the group (1295±1.74 Mpc), we expect to find HI masses as low as 9.08 × 10⁹ M_⊙ for a 3σ detection. Compared to current ALFALFA data on parts of the dense Virgo cluster and a nearby void, this subset of data will contribute to the survey by providing observations of an intermediate galaxy density environment.

Workshop Program:

Wednesday, 6 July, Workshop begins at 11:00AM

Lectures:

Introduction to ALFALFA and the Arecibo Telescope, R. Giovanelli
Fundamentals of Radio Astronomy, L. Hoffman
Overview of the Arecibo Telescope, S. Stierwalt
Using ALFA for ALFALFA, M. Haynes



M. Haynes, S. Stierwalt, B. Kent lead the remote Arecibo observing session at Union College. Projected on the right screen is the telescope status window showing us that we are almost ready to start observing.

Remote Observing Wednesday after dinner

Thursday, 7 July

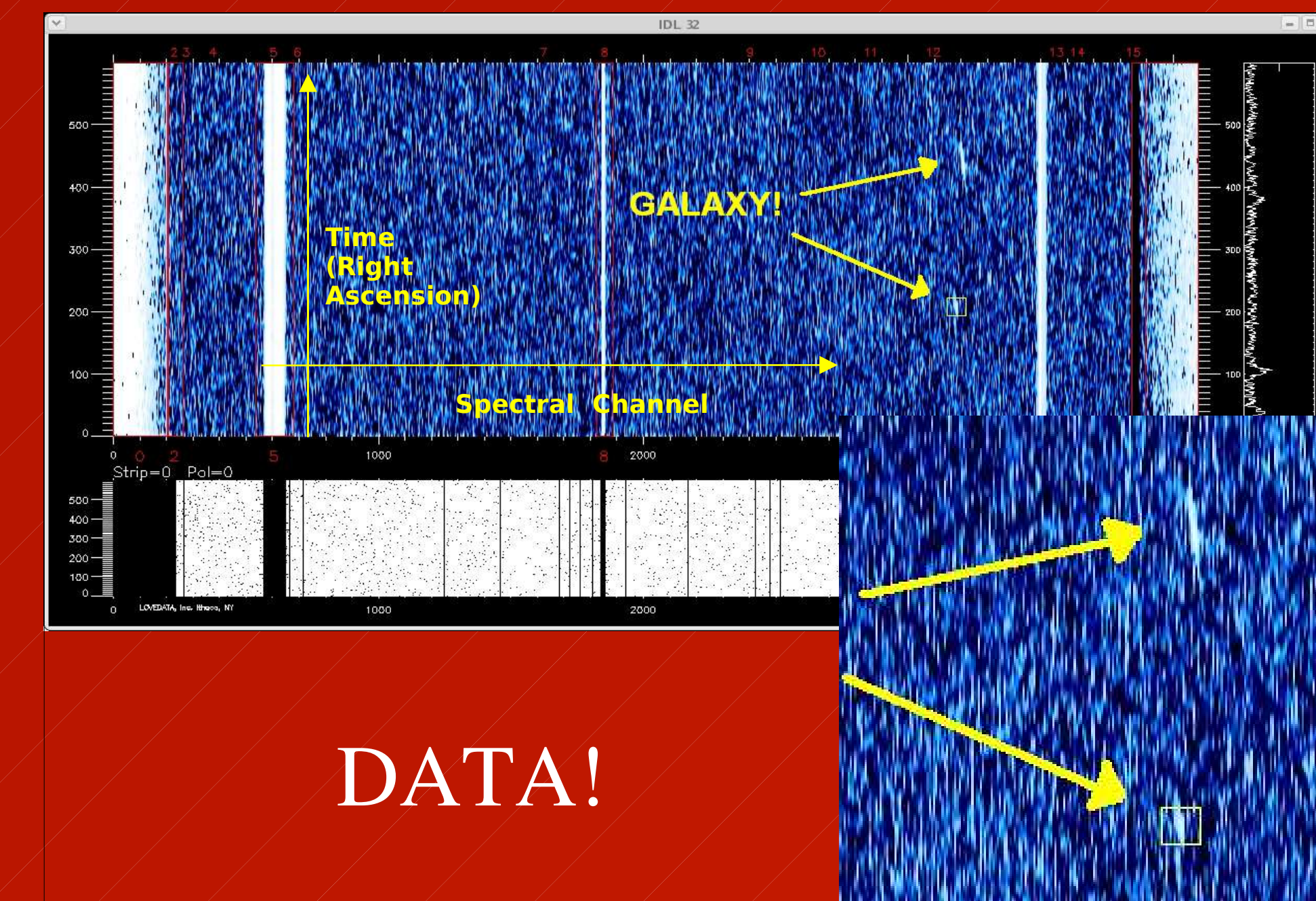
Morning Lectures:

Overview of the Local Universe, B. Kent
Overview of Extragalactic HI, R. Giovanelli
Optical Counterparts of HI-rich Galaxies, J. Salzer
ALFALFA in 2005: Results and Plans, M. Haynes

Afternoon Data Reduction:

Students introduced to data format and reduction
Faculty plan future collaboration

Workshop ends at 3:00PM



After Workshop:

Students continued to meet electronically throughout summer

Presentation powerpoints made available on ALFALFA website

Several students have continued ALFALFA work as senior or other term projects, including observing at Arecibo

Ongoing student projects:

Analysis of Workshop Remote Observations
John Ayala, U. Puerto Rico (Pantoja) **See Poster 179.21**

Structure in the Virgo Cluster
Bilal Mahmood, Union (Koopmann)

Rich Groups in the ALFALFA Survey
Brian Walsh, Colgate (Balonek)

Low-mass CDM halos in Group-Free Environments
Adeel Altaf, Lafayette (Hoffman)

Participants

Institution	Participants
Arecibo	Jose Alonso (Director, Visitor Center at Arecibo)
Colgate	Tom Balonek + 4 undergrads
Cornell	Martha Haynes + 2 undergrads Riccardo Giovanelli 2 grads
Lafayette	Lyle Hoffman + 2 undergrads
U. Puerto Rico	Carmen Pantoja + 1 undergrad
St. Lawrence	Aileen O'Donoghue
Union	Becky Koopmann + 4 undergrads
Wesleyan	John Salzer



UNION COLLEGE

First ALFALFA Undergraduate Workshop
Schenectady, New York
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Conclusions

• Workshop experience was a highlight of the students' summer research projects

• Remote observing and proposal-writing excited students and encouraged group effort

• Undergraduate projects are contributing to the ALFALFA survey

• Workshop presentations are publicly available

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