A Tale of Two Groups: USGS 562 and 579
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Introduction
The properties of galaxy groups USGS 562 and 579 are studied to investigate the effects of their local environment on the evolution and characteristics of galaxies in the region. We draw data from the ongoing Arecibo Legacy Fast ALFA (ALFALFA) Survey of neutral hydrogen (see image below), Sloan Digital Sky Survey (SDSS), and NASA/IPAC Extragalactic Database (NED). We use this data to help determine group membership, and to calculate galactic hydrogen mass, dynamical mass, solar masses, etc.

ALFALFA data is collected from the 1000 foot wide Arecibo radio telescope. It's the largest single-aperture telescope in the world, and is located in Puerto Rico near the city of Arecibo.

Neutral Hydrogen Data
We gather neutral hydrogen data collected at Arecibo by using software developed by R. Giovanelli and M. Haynes. For each galaxy we find the flux, center velocity, and velocity width. Some of the galaxies have a neutral hydrogen flux too small to be detected by ALFALFA, in which case we estimate an upper limit on the flux.

Calculations
We use our data to calculate the neutral hydrogen mass or an upper limit on the hydrogen mass of the galaxies we measured, using the measured flux or the estimated upper limit respectively. We would also like to calculate stellar masses, star formation rates and the total mass of the group.

Group Membership
We obtain a list of galaxy data in the area from the AGC catalog by using IDL software developed by R. Giovanelli and M. Haynes (who have made significant contributions to the ALFALFA project). When a galaxy group settles into equilibrium, its galaxies can be found in a certain velocity range at any given distance from the group center. When velocity vs. radius is graphed, the group members should lie within a 'trumpet-shaped' curve. Group USGS 562, however, may not be completely formed yet, causing this method to be less clear. We also make use of software developed at Skidmore College by McGowan et al that determines group membership by similar means, and the results agree well with the results of our graph.

Discussion
Future goals for this research include investigating the hydrogen deficiency in sample galaxies by using a method devised by M. Haynes and R. Giovanelli, modified by Toribio et al. We would then compare the all galaxy properties inside and outside the groups, including stellar masses and star formation rates as well as neutral hydrogen deficiencies. This will help to further knowledge of galaxy formation and evolution, and contribute to the overall ALFALFA effort.