CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35749

Project Title

Observational Study of Properties of Active Galactic Nuclei

Abstract

Objectives/Goals

The objective of this project was to see how the morphology of galaxies who host Active Galactic Nuclei (AGN) are different from those that do not.

Methods/Materials

-If the Hardness Ratio of the sample is greater than -0.3 it is an AGN
-If the Hardness Ratio of the sample is less than -0.3 it is a non-AGN
-Gather additional data required to run the tests. Required data consists of:
-RA, Dec, Full_flux, HR_Classical, Flux_RADIUS, MAG_AUTO, A_IMAGE, B_IMAGE
Inputting Data into Galfit Using Aquamacs
Input data into corresponding location in the Image and Galfit Control Parameters. Change path A to the location of the data image. (This is what you will be experimenting with) Change path B to the location of the output image. (This is where the results will end up in) Change path C to the location of the data image. Keep path D the same. Change path H to the size of the image. Change path I to the size of the convolution box (x, y). Change J to the magnitude (MAG_AUTO).
Sersic
NOTE: Any unmentioned steps should remain unchanged
Change #1 to the position of the AGN/Non-AGN. Change #2 to a number between 20-25. This number is about trial and error- there is no way to know exactly which number to input. Change #3 to Flux_RADIUS. Keep #4 the same. Change #5 to a number between 0-4. Note: cannot equal 0. Subtract 90 from the position angle and input it into step #10.
Sky
In section sky, only #1 needs to be changed. To do so open the file in Topcat. When in the table, look for the header called "BACKGROUND" then type the corresponding number into #1.
Running the Program with Galfit
Open Terminal and type in "galfit" to open up galfit. Enter the name of the program to initiate the testing process.

Results

It was found that most of the galaxies were elliptical galaxies because their sersic_index was over 2.5. Based on the distribution of sersic parameters, it was found that there is a high likelihood for black holes to be hosted at the core of elliptical galaxies and not spirals.

Conclusions/Discussion

Summary Statement

We were curious to see if the presence of a Black Hole at the center of a galaxy affected the shape and size of the galaxy.

Help Received

Under supervision of Dr. Mobasher, we were able to do our project at University of California Riverside. Our mentors who guided us were Laura Green and Vivian U.

Preliminary