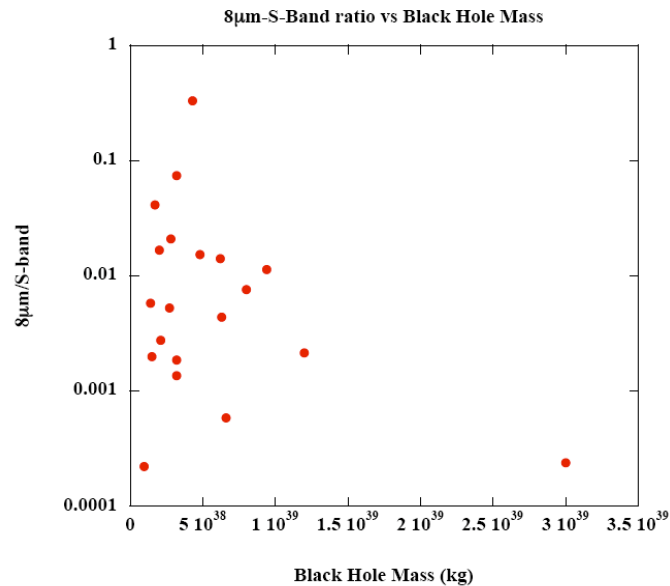


This is a summary of results from the 2007-2008 joint observing campaign between GAVRT and the Spitzer Space Telescope. This campaign allows students to study a certain type of galaxy using both our radio telescope and an infrared telescope (which happens to be in space!). The galaxies we are looking at are unusually bright. We believe this is because a massive black-hole at their center is causing tremendous amounts of energy to be emitted. These galaxies are referred to as AGN, which stands for “Active Galactic Nuclei.” The primary thing we are looking for is whether or not a relationship exists between the mass of the central black hole, and the emitted energy. We expected a relationship to show up if we compared the black-hole mass to the ratio of infrared energy to radio energy. For more background information, see our [Introduction to AGN](#).

After gathering data on 20 Active Galactic Nuclei (AGN) we see no correlation between the ratio of infrared to radio emission and the mass of the central black hole. You can see this in the figure below, which summarizes the data collected and analyzed by students. Does the ratio get bigger as the mass increases? Does the ratio get smaller? It seems to us that there is no clear trend.



This is a little bit surprising, and warrants further investigation. The lack of correlation may be due to the somewhat limited black hole mass range that we sampled, or it could be that variability between the time that the IR light was emitted and when the radio light was emitted is masking the correlation (the IR and radio emission we see come from different locations, so there might be a delay between changes happening at one wavelength and the other). To test the first possibility, you can help the project by observing black holes with much larger and smaller masses to see if a correlation emerges.

Our preliminary results were presented at the American Astronomical Society meeting in Austin, Texas, in January 2008. Click [here](#) for a copy of that presentation.