ASTRO-MIDI
Jeudi 14 novembre 2019 - 11h00
POP-2165

Dre Andreea Petric
Astronome résidente de l'Institut d'Astronomie de l'Université d'Hawaii à Manoa au Télescope Canada-France-Hawaii.

Galaxy Mergers and the Growth of Super Massive Black Holes

Interactions between galaxies of similar mass enhance both star-formation and SMBH growth. Galaxy mergers are able to produce galaxies whose central masses correlate with their bulge masses. However the scatter in this correlation is larger than measurement errors and suggests the need for other mechanisms at play: processes associated with the central accreting black hole and/or star formation that shape the evolution of the host galaxy. These feedback processes work by regulating the fuel available for star formation, i.e. the interstellar medium (ISM). My goal is to determine how the ISM of galaxies hosting growing SMBH at their center is shaped by them and by gravitational interactions with other galaxies. With graduate student Erini Lambrides and IfA REU Rebecca Minsley we constructed a library of SPITZER MIR spectra, gas and dust emission features, dust and gas masses, silicate absorption strengths and optical morphologies based on Pan-STARRS data for active galaxies. I will present statistically significant evidence that at low redshift non-radio loud AGN can also impact the molecular gas of their host galaxies. We find that in AGN-hosts, the ISM is warmer, the PAHs are more ionized, and the silicate strengths have a wider range of values than in non-AGN hosts. We find some statistical differences between the H_2 of mergers and non-mergers, but those differences are less statistically significant than those between AGN and non-AGN hosts. We also infer that the warm gas and dust of non-AGN hosts spans a smaller range of properties than that of AGN-dominated sources. AGN hosts have higher H_2 to PAH ratios, and higher H_2 temperatures, and deeper silicate absorption features. These statistical findings may reflect a wide range of triggering mechanisms, AGN orientations, and the evolutionary stages of the host galaxies but only with JWST's MIRI will we have the spatial resolution to test this.

Nearby ($z < 0.2$), merging, gas-rich galaxies are Luminous Infrared Galaxies (LIRGs). Their proximity makes the ideal candidates to study the impact mergers have on star formation, AGN triggering, dual AGN, and enrichment of the circumgalactic medium (CGM). The instrument build at Laval for CFHT is ideal for the study of the closest LIRGs and I will present data on several such systems. We found complex molecular gas kinematics in all LIRGs we observed with SITELLE but the most spectacular results came from observations of a dual AGN host, merger system, Mrk 266. Using emission line diagnostics, we find that more than 50% of Hα gas originates from shocked gas either associated with the AGNs or with the tidal disruption. Mrk 266's complex [OIII] dynamics allow us to speculate that this merger system is analogous to some of the high redshift, dusty systems observed to have high velocity [OIII] outflows. The kinematics of the outflowing materials suggests that Mrk 266 is enriching the CGM in agreement with theoretical work on the role of mergers in transporting metals to the CGM.