ACTIVE GALAXIES

Not that different after all

Preprint at https://arxiv.org/abs/1905.06961 (2019)

Molecular gas is the reservoir from which stars are formed. The evolution of molecular gas content in galaxies is therefore key in understanding how galaxies grow. Allison Kirkpatrick and collaborators take a closer look at the role the active galactic nuclei (AGNs) may play in regulating molecular gas in their host galaxies. They find no statistically significant evidence that galaxies hosting AGNs have higher or lower star formation efficiency than their non-active counterparts.

This work is based on a sample of 67 galaxies observed in the mid- and far-infrared, as well as in CO emission (typically multiple transitions). Kirkpatrick et al. calculate the total infrared luminosity of each source, the contribution to it from the AGNs, and each galaxy's dust and gas mass. The authors highlight the importance of properly accounting for the AGN contribution to the total infrared luminosity of a galaxy. Comparing sources whose emission is dominated by the AGNs and those that is not, they find that their star formation efficiency and gas depletion timescale is statistically the same. This result puts a wrench in the narrative of AGNs quenching the growth of the galaxies they reside in.

The authors also calculate the ratio between gas and dust in these galaxies. They find it to be statistically constant irrespective of AGN power, redshift and infrared luminosity, making dust a good tracer of molecular gas in massive and dusty galaxies. The authors finally report that excitation of CO in AGN-dominated galaxies is slightly higher than in star-forming galaxies, but their result is uncertain, as the majority of their sources have only a few CO transitions observed.

Marios Karouzos

Published online: 27 June 2019
https://doi.org/10.1038/s41550-019-0848-2