[구GC-05] "Maintenance"-mode feedback and the host galaxies of radio-AGN

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There exists strong evidence supporting the co-evolution of central supermassive black holes and their host galaxies; however it is still under debate how such a relation comes about and whether it is relevant for all or only a subset of galaxies. An important mechanism connecting AGN to their host galaxies is AGN feedback, potentially heating up or even expelling gas from galaxies. AGN feedback may hence be responsible for the eventual quenching of star formation and halting of galaxy growth. A rich multi-wavelength dataset ranging from the X-ray regime (Chandra), to far-IR (Herschel), and radio (WSRT) is available for the North Ecliptic Pole field, most notably surveyed by the AKARI infrared space telescope, covering a total area on the sky of 5.4 sq. degrees. We investigate the star-formation properties and possible signatures of radio feedback mechanisms in the host galaxies of 237 radio-AGN below redshift z=2 and at a radio 1.4 GHz flux density limit of 0.1 mJy. Using broadband SED modeling, the nuclear and host galaxy components of these sources are studied simultaneously as a function of their radio luminosity. Here we present results concerning the AGN content of the radio sources in this field, while offering evidence supporting a ``maintenance'' type of feedback from powerful radio-jets.

[구GC-06] Nature of the Wiggle Instability of Galactic Spiral Shocks

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Gas in disk galaxies interacts nonlinearly with a underlying stellar spiral potential to form galactic spiral shocks. Numerical simulations typically show that these shocks are unstable to the wiggle instability, forming non-axisymmetric structures with high vorticity. While previous studies suggested that the wiggle instability may arise from the Kelvin-Helmholtz instability or orbit crowding of gas elements near the shock, its physical nature remains uncertain. It was even argued that the wiggle instability is of numerical origin, caused by the inability of a numerical code to resolve a shock that is inclined to numerical grids. In this work, we perform a normal-mode linear stability analysis of galactic spiral shocks as a boundary-value problem. We find that the wiggle instability originates physically from the potential vorticity generation at a distorted shock front. As the gas follows galaxy rotation, it periodically passes through multiple shocks, successively increasing its potential vorticity. This sets up a normal-mode that grows exponentially, with a growth rate comparable to the orbital angular frequency. We show that the results of our linear stability analysis are in good agreement with the those of local hydrodynamic simulations of the wiggle instability.