

[7GC-20] Low Luminosity AGNs at the center of the Perseus Cluster

Songyoun Park^{1,2,3}, Jun Yang³, Raymond Oonk⁴, Zsolt Paragi³

¹*Department of Astronomy, Yonsei University, Seoul, Republic of Korea*

²*Korea Astronomy and Space Science Institute, Daejeon, Republic of Korea*

³*Joint Institute for VLBI in Europe (JIVE), Dwingeloo, the Netherlands*

⁴*Netherlands Institute of Radio Astronomy (ASTRON), Dwingeloo, the Netherlands*

We investigate the origin of radio emission in nearby early-type galaxies using the European VLBI Network (EVN) at 1.4 GHz. The sample included NGC 1277, which was found to have an over-massive black hole of $1.7 \times 10^{10} M_{\odot}$, and four other early-type galaxies in the Perseus cluster. All the sources were detected above 5σ . They show compact radio cores and high brightness temperatures, $10^7 \sim 10^9$ K, which implies that radio emission in these objects is non-thermal. While the observed radio luminosities could be consistent with star formation ($\sim 1 M_{\odot} \text{yr}^{-1}$), the small source size would imply a specific star formation rate (sSFR) of $\sim 10^6 M_{\odot} \text{yr}^{-1} \text{kpc}^{-2}$. Such a high sSFR rules out ongoing star formation. Supernovae (SNe) are ruled out as well because it is unlikely that we see SNe in all galaxies at the same time, and there is no significant radio variability either. The most plausible scenario is that these galaxies show low luminosity AGN activity in the radio, although there is no sign of AGN activity in other bands. If our interpretation is correct, then regular early-type galaxies may harbor active AGN more often than suspected from observations at other wavelengths.

[7GC-21] Local Environmental Effects on AGN Activities

Jaemin Kim and Sukyoung K. Yi

Department of Astronomy, Yonsei University, Korea

The local environmental effects on the active galactic nucleus (AGN) activity has been studied by many authors, but there is still controversy. We performed statistical analysis for nearby ($0.01 < z < 0.05$) volume limited ($M_r < -19$) sample via visual inspection based on Sloan Digital Sky Survey Data Release 7. We visually inspect around 50,000 galaxy images to find peculiar objects which show not only ongoing merging features and tidal features, but also post merging features like shell or ring structures. We found that the frequency of AGN host galaxies is at least 2 times higher among peculiar galaxies than non-peculiar galaxies, and this trend is still visible when galaxy properties such as color or stellar mass are fixed. Furthermore, L[OIII] of peculiar galaxies is found to be more increased than those of normal galaxies. The majority of the most luminous AGN hosts show peculiar feature, which indicates that the luminous AGN galaxies may be the result of the local environmental effects. In addition, the enhancement of L[OIII] in peculiar galaxies is more significant for bluer galaxies, which implies that AGN activity is enhanced effectively when gas is available. In order to ensure our results, we also checked it for a smaller subsample with 2 magnitude deeper monochromatic images provided by SDSS Stripe82 database, and found consistent results. Overall, the results of this study tell us that the local environment of galaxies affects the frequency as well as the strength of AGN activity.