galaxy morphology based on criteria related to secular or merger related evolution and find that the morphological mixture of galaxies varies considerably from cluster to cluster. Moreover it depends on the characteristics (e.g. cluster mass) of cluster itself which implies that environmental effects in cluster scale is also an important factor to the evolution of galaxies together with intrinsic (secular) and galaxy merger. Our deep imaging survey for morphological inspection of cluster galaxies with low surface brightness is expected to be a useful basis to understand the nature of cluster galaxies and their internal/external evolutionary path.

[포 GC-05] Updating calibration of CIV-based single-epoch black hole mass estimators

Daeseong Park[1], Aaron J. Barth[2], Jong-Hak Woo[3], Matthew A. Malkan[4], Tommaso Treu[4], Vardha N. Bennert[5], Anna Pancoast[6]
[1]Korea Astronomy and Space Science Institute, [2]UC Irvine, [3]Seoul National University, [4]UCLA, [5]Cal Poly, [6]Harvard-Smithsonian CfA

Black hole (BH) mass is a fundamental quantity to understand BH growth, galaxy evolution, and connection between them. Thus, obtaining accurate and precise BH mass estimates over cosmic time is of paramount importance. The rest-frame UV CIV λ1549 broad emission line is commonly used for BH mass estimates in high-redshift AGNs (i.e., $2 \lesssim z \lesssim 5$) when single-epoch (SE) optical spectra are available. Achieving correct and accurate calibration for CIV-based SE BH mass estimators against the most reliable reverberation-mapping based BH mass estimates is thus practically important and still useful. By performing multi-component spectral decomposition analysis to obtained high-quality HST UV spectra for the updated sample of local reverberation-mapped AGNs including new HST STIS observations, CIV emission line widths and continuum luminosities are consistently measured. Using a Bayesian hierarchical model with MCMC sampling based on Hamiltonian Monte Carlo algorithm (Stan NUTS), we provide the most consistent and accurate calibration of CIV-based BH mass estimators for the three line width characterizations, i.e., full width at half maximum (FWHM), line dispersion (σ_{line}), and mean absolute deviation (MAD), in the extended BH mass dynamic range of log $M_{BH}/M_{\odot}$ = 6.5-9.1.

[포 GC-06] Gravitational Instability of Rotating Isothermal Rings

Sanghyuk Moon and Woong-Tae Kim
Seoul National University

Nuclear rings at centers of barred galaxies exhibit strong star formation activities.
They are thought to undergo gravitational instability when sufficiently massive. We approximate them as rigidly-rotating isothermal objects and investigate their gravitational instability. Using a self-consistent eld method, we first construct their equilibrium sequences specified by two parameters: α corresponding to the thermal energy relative to gravitational potential energy, and R_B measuring the ellipticity or ring thickness. The density distributions in the meridional plane are steeper for smaller α, and well approximated by those of infinite cylinders for slender rings. We also calculate the dispersion relations of nonaxisymmetric modes in rigidly-rotating slender rings with angular frequency Ω and central density ρ_c. Rings with smaller are found more unstable with a larger unstable range of the azimuthal mode number. The instability is completely suppressed by rotation when Ω exceeds the critical value. The critical angular frequency is found to be almost constant at $0.7(G\rho_c)^{1/2}$ for $\alpha > 0.01$ and increases rapidly for smaller α. We apply our results to a sample of observed star-forming rings and confirm that rings without a noticeable azimuthal age gradient of young star clusters are indeed gravitationally unstable.

[포 GC-07] A case study of extraplanar molecular gas in a Virgo spiral using the ALMA

Bumhyun Lee and Aeree Chung
Department of Astronomy, Yonsei University

NGC 4522 is a spiral galaxy located in the Virgo cluster which appears to be undergoing active ram pressure stripping due to the intracluster medium (ICM). What makes this galaxy special is the extraplanar CO gas, some of which coincides with the extraplanar Hα patches. As one of the few cases where the interstellar molecular gas is thought to have been pushed out from the stellar disk by the ICM, this galaxy provides an opportunity to study the impact of ICM pressure on the dense/star forming gas and its fate in the extraplanar space after stripping. In order to probe detailed molecular gas properties inside and