[박GC-01] The Nature of the SDSS Galaxies in Various Classes based on the Morphology, Color, and Spectral Features

Joon Hyeop Lee
Seoul National University, Korea Astronomy and Space Science Institute

I present a comprehensive study about the nature of the SDSS galaxies in various classes based on their morphology, color and spectral features, using multi-wavelength survey data. Using three respective criteria, the SDSS galaxies are classified into early-type and late-type; red and blue; passive, HII, Seyfert and LINER, which returns total 16 fine classes of galaxies. I estimate the luminosity dependence of seven physical quantities in each class, and compare the properties of galaxies between classes, using the SDSS data (optical). In addition, using the 2MASS, IRAS, FIRST, GALEX, and ROSAT data (from radio to X-ray), I investigate the star formation histories, dust contents, and AGN activities of galaxies in the 16 fine classes. Galaxies in each fine class show their own distinguishable features, which implies that studies using a simple classification of galaxies have a risk of mixing up different kinds of objects with different natures. I probe the environmental dependence of galaxies in each class, finding that most fine classes show different distributions in their environmental parameters from each other, which implies that the origin of galaxies in each class may be closely related to their local environmental density. The implications of these results on galaxy evolution are discussed.

[구GC-02] The Effect of Radial Metallicity Gradient within Early-type Galaxies on their Scaling Relations

Ho Lee[1,2], Dong-Hyun Lee[1,2], Suk-Jin Yoon[1,2]
[1]*Department of Astronomy, Yonsei University*
[2]*Center for Space Astrophysics, Yonsei University*

Most early-type galaxies show the internal radial gradient of stellar metallicity in the sense that metallicity increases toward the galaxy center. The zero-point of the radial metallcity gradient increases with increasing galaxy luminosities (and masses), causing well-known color-magnitude relations among early-types. Such a systematic variation in metallicity and thus in mass-to-light ratio should break down to some extent the connection between the intrinsic mass profile and, its proxy, the light profile. However, theoretical studies on the stellar population effect on the Scaling Relations often consider a galaxy to be a point-like object rather than one with a surface area, thus overlooking the systematic influence of the radial population gradient on the Scaling Relations. In this talk, we will demonstrate that the radial metallicity gradient has an impact on the size of a galaxy's half-light radius and its mass-to-light ratio therein. Our results give remarkably simple and cohesive explanations for the Scaling Relations, including the Kormendy and Fundamental Plane relations.

This work was supported by the Korea Research Foundation Grant funded by the Korean Government (KRF-2006-331-C00134).