[포GC-11] Emission mechanism of blazar OJ287 in 2003-2008

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In last about a century, OJ287 is the most studied blazar especially in the optical bands. It is believed that it has a super-massive binary black hole system. Variability study of blazars is a powerful tool to understand the emission mechanism. There are several existing models which can explain the variability behavior of blazars in their different stages (e.g. low-state, pre-post outburst state and outburst state). Since September 2003 to October 2008, we have carried out optical monitoring of the blazar OJ287, using the 61 cm telescope at the Mt. Sobaek Observatory in the Republic of Korea and the 1.0 m robotic telescope at the Mt. Lemmon Observatory in Arizona, USA, in four optical bands (BVRI). We found magnitude and color variations in the blazar. We also found correlations in colors and magnitudes. Emission mechanism on short and long time scales are different. In the last 5 years of our observations, the blazar has probably gone to all possible stages (e.g. low-state, pre-post outburst state and outburst state). Variability detected in the low-state of the source will be due to the thermal emission by accretion disk. In the high-state(pre-post outburst state and outburst state), non-thermal jet emission will be dominant.

[구GC-12] How galaxy interaction and large-scale environment jointly determine galaxy properties?

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We inspect the coupled dependence of physical parameters of galaxies on the small-scale (distance to and morphology of the nearest neighbor galaxy) and the large-scale (background density smoothed over 20 nearby galaxies) environmental factors. We find two characteristic neighbor-separation scales where the galaxy interactions cause abrupt changes in the properties of galaxies. The first scale is the virial radius of the nearest neighbor galaxy $r_{vir,nei}$,which is typically between 200 and 400 h^{-1} kpc for the galaxies in our sample. The second scale is the scale at which the galaxies in pairs start to merge. We find that late-type neighbors enhance the star formation activity of galaxies while early-type neighbors reduce it, and that these effects occur within $r_{\rm vir,nei}$. The hot halo gas and cold disk gas must be participating in the interactions at separations less than the virial radius of the galaxy plus dark halo system. Our results demonstrate the importance of galaxy-galaxy interactions in building the correlations between the galaxy properties and environment. They also show that the role of the large-scale density in determining galaxy properties is minimal once luminosity and morphology are fixed. We propose that the weak residual dependence of galaxy properties on the large-scale density is due to the dependence of the halo gas property on the large-scale density.