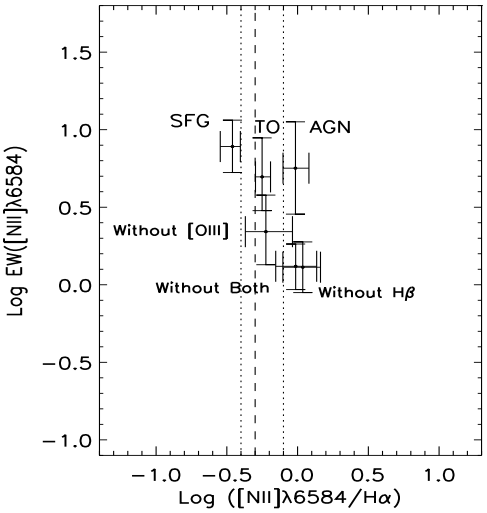

Fig. 1. NII diagnostic diagram; shown are medians and quartiles of NELGs with emission lines missing, compared with NELGs classified using standard diagnostic diagrams.

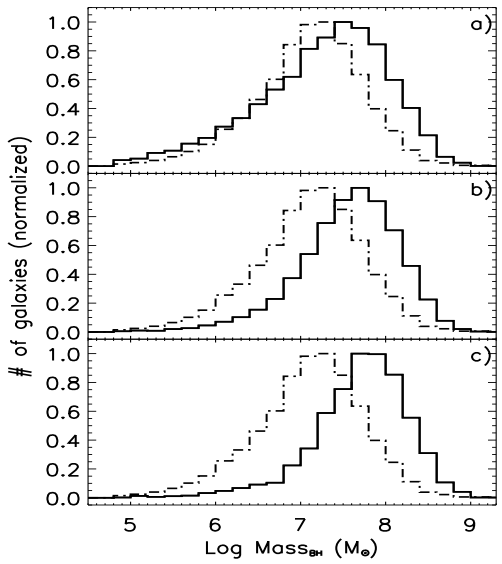

Fig. 2. Distributions of the bulge masses: (a) galaxies without [OIII]; (b) galaxies without Hβ; (c) galaxies without both lines. The point dashed line corresponds to the luminous AGNs.

tion for the resolution (Greene & Ho 2006), the FWHM of Hα fall between 25/75 percentiles 290 and 499 km s^{-1}. This is compared with 337 to 478 km s^{-1} in luminous AGNs and 253 to 292 km s^{-1} in SFGs. The gas producing the emission is moving at relatively higher speed in AGNs than in SFGs.

The morphology of the galaxies were determined based on photometric colors and inverse concentration index (Shimasaku et al. 2001). While the galaxies without [OIII] are late-type spirals, $T \geq 3$, the galaxies without Hβ and with both lines missing are dominantly early-type galaxies, $T \leq 2$. In general, the fraction of early type galaxies increases rapidly as the EW decreases. Consistent with the morphology classification, the star formation histories as determined by STARLIGHT indicate that the NELGs without Hβ and those with both lines missing show no evidence of star formation activity since $t = 10^9$ yr.

We compare the mass of the bulges as found in the three different samples of NELGs with emission lines missing in Figure 2. The bulges in the galaxies without Hβ and with both lines missing are generally more massive than in the luminous AGNs.

In their study of the activity of compact groups of galaxies Coziol et al. (1998) and Martínez et al. (2008, 2010) have found many examples of NELGs with emission lines missing, consistent with LLAGNs. Previous observations by Phillips et al. (1986) have also shown this phenomenon to be common in clusters of galaxies, affecting between 55% to 60% of all early-type galaxies. Although we do not have a definite evidence yet, our preliminary analysis suggests that more than 50% (87% for the galaxies without both lines) are in dense galactic environments. Therefore, the LLAGNs phenomenon may be related to a particular evolutionary phase of galaxies that formed in dense galactic environments.

There is presently no consensus among researchers on what is the physical nature of AGNs with low luminosity. However, according to the standard interpretation, an AGN is produced by the accretion of matter onto a massive black hole. Therefore, one possibility to explain the LLAGNs would be that the strong astration rates necessary to produce the massive bulges of galaxies in dense galactic environments have depleted the galaxies of most of their gas, affecting the accretion rates of their black holes.

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