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The downplayed role of secular processes in the co-evolution of galaxies and black holes

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Abstract. According to the current co-evolution picture, most present-day galaxies experienced at least one phase of vigorous black hole (BH) activity in the past, during which a tight link between galaxy and BH gets established. While during the last two decades we have witnessed tremendous progress in the field, additional robust observational constraints are required on how galaxy and BH related at earlier times, and which mechanisms are responsible for triggering these BH growth phases. In our recent studies, we analyzed a large sample of active galactic nuclei (AGN) out to $z \sim 1$ from the COSMOS survey (Scoville *et al.* 2007), allowing us to study in detail growing BHs together with their host galaxies. In Cisternas *et al.* (2011b) we found that, for a sample of 32 active galaxies at $z \sim 0.7$, BH mass scales with total galaxy stellar mass in the same way as it does locally, at $z = 0$, with galactic bulge mass. I will argue that for these galaxies to obey the local relation only a disk-to-bulge stellar mass redistribution is needed, likely driven by passive secular evolution. I will also present the results from Cisternas *et al.* (2011a), aiming to understand the relevance of major mergers as AGN activity triggering mechanisms. By looking for merging signatures on the morphologies of 140 AGN (some examples shown in Figure 1), and comparing them with a sample of over 1200 matched inactive galaxies, we found that the merger fraction between samples is statistically the same, at roughly 15%. Together with the fact that the majority of the AGN host galaxies are disk-dominated, unlikely relics of a recent major merger, these results are the strongest evidence to date that secular evolution rather than major merging has dominated BH fueling at least since $z \sim 1$.

Keywords. galaxies: evolution, galaxies: active, galaxies: bulges, galaxies: interactions

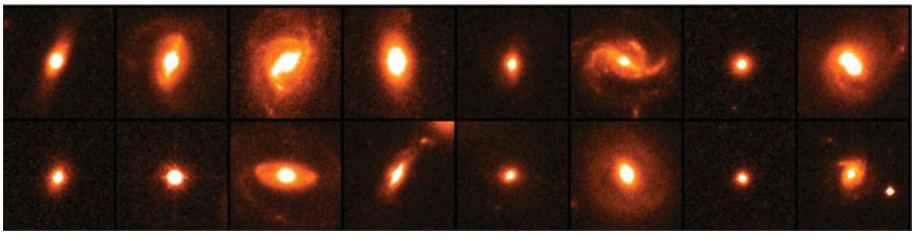

Figure 1. Representative examples of AGN host galaxies out to $z \sim 1$ imaged with *HST*/ACS illustrating that interacting galaxies are a minority and disks are highly common.

References

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