Merger-Free Galaxies Hosting Luminous AGN

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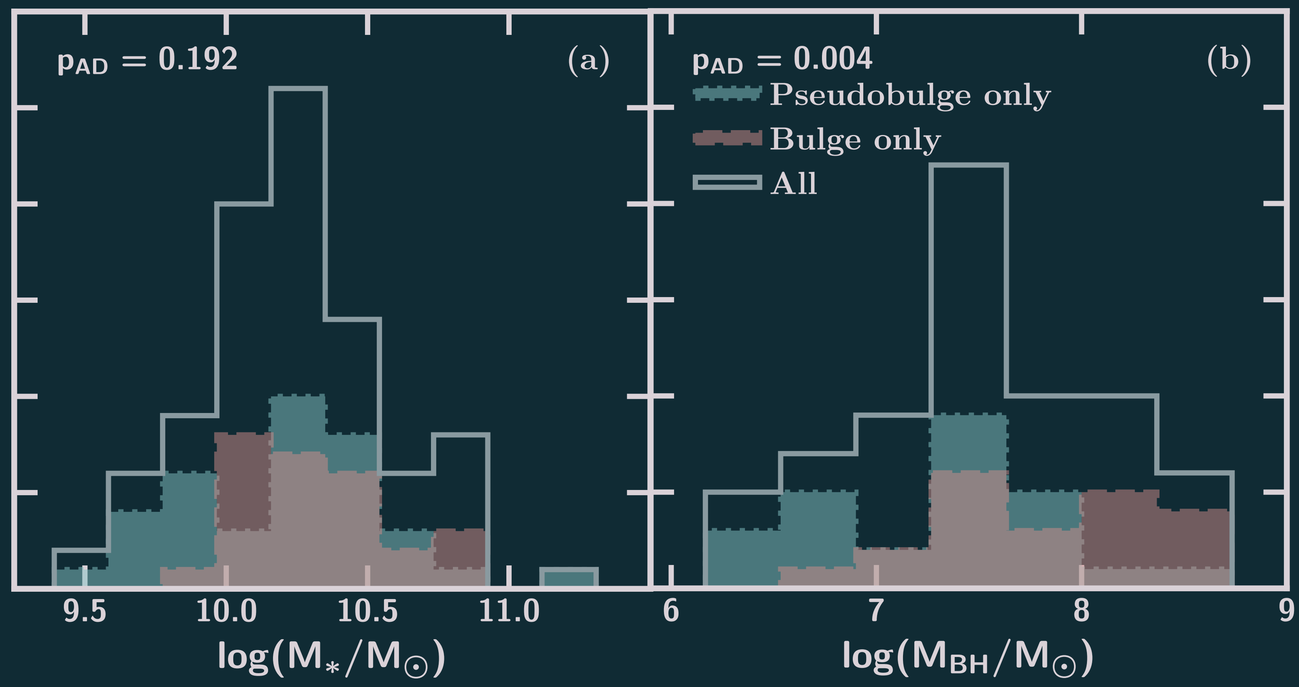
Introduction:

- Active galactic nuclei (AGN) in merger-free (i.e., disk-dominated) galaxies are poorly understood, despite these secular (non-merger driven) processes being the main drivers of supermassive black hole growth[1;2].
- We obtain HST images of 92 galaxies hosting Type 1 AGN, and with little-to-no bulge component visible in SDSS images[3].
- Via GALFIT[4;5], we obtain robust morphologies; 49 of our galaxies contain a classical bulge component, and 55 contain a pseudobulge (identified via the Kormendy Relation[6]).

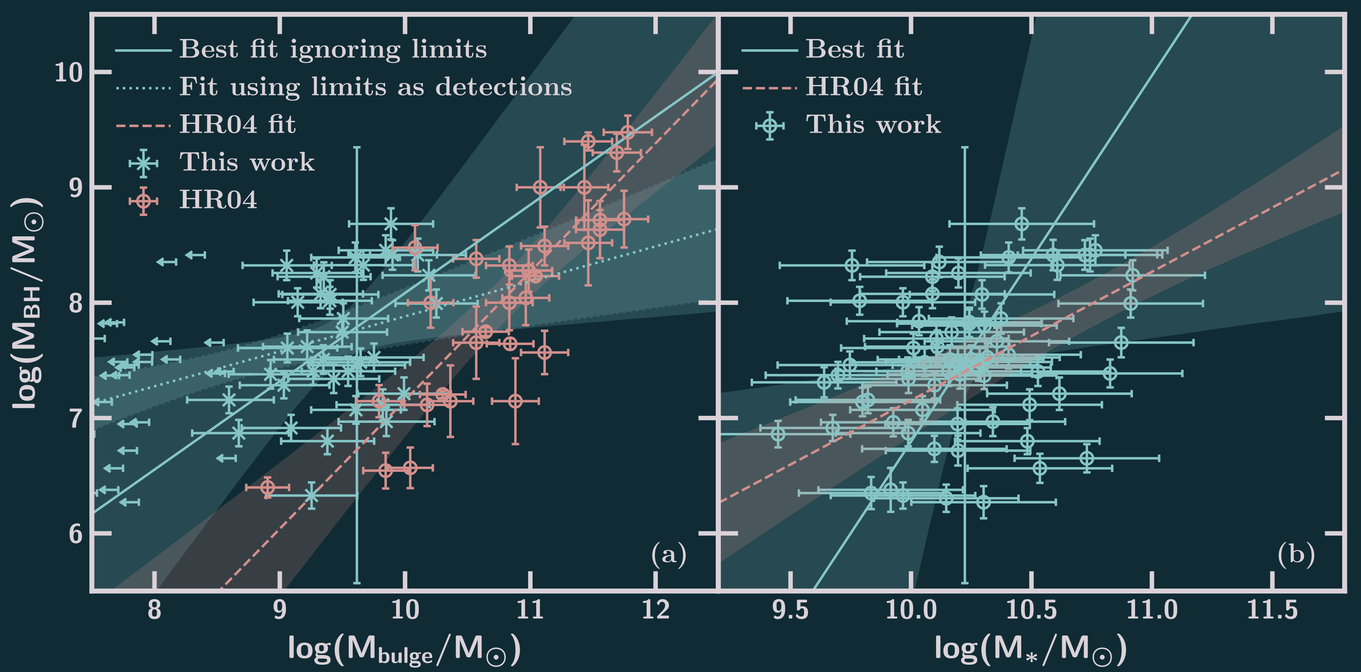


⇐Fig 1: (a) Stellar mass, M_* (b) Black hole mass, M_{BH}. Results for the entire sample are in unfilled, for galaxies with only a bulge and no pseudobulge in red, and for galaxies with only a pseudobulge and no bulge in blue. p-values are for AD tests when comparing the bulge-only and pseudobulge-only samples. For M_*, the samples are consistent with being drawn from the same parent distribution, but for M_{BH}, they are not.

Conclnusions:

- High scatter in the relations for disk dominated galaxies compared to galaxies with a larger bulge component indicate that merger-free growth is more stochastic than merger-driven.
- There is still a correlation between M_{BH} and both M_{bulge} and M_* in disk galaxies. Thus, these secular mechanisms are not so stochastic as to prohibit co-evolution

⇒Fig 2: Scaling relations for black hole mass, M_{BH} with (a) bulge stellar mass, M_{bulge} and (b) galaxy stellar mass, M_*. Arrows indicate upper limits for sources where no bulge component was resolved. The Häring and Rix (HR04) relation[7] is shown in red and is consistent with our sample where we ignore upper limits, but not where we treat upper limits as detections. The HR relation is also significantly more correlated than ours. For the M_*-M_{BH} relation, we again show the HR fit. Whilst our results agree with the HR relation, there is a high amount of scatter.



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