Bar-driven fuelling of AGN

Izzy Garland
(they/them)

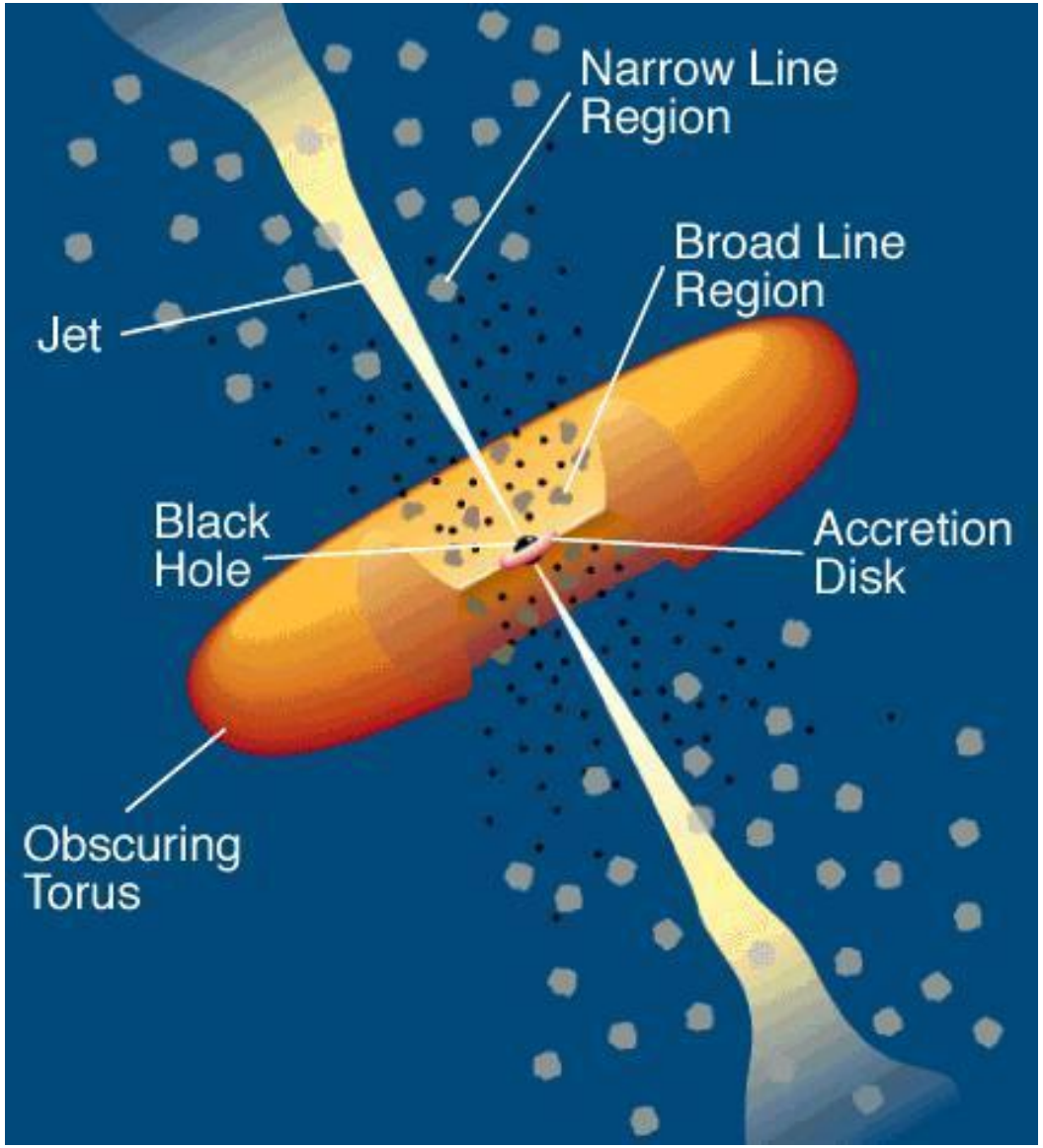
9 July 2025

@izgarland.bsky.social
garland@mail.muni.cz

NAM-Durham

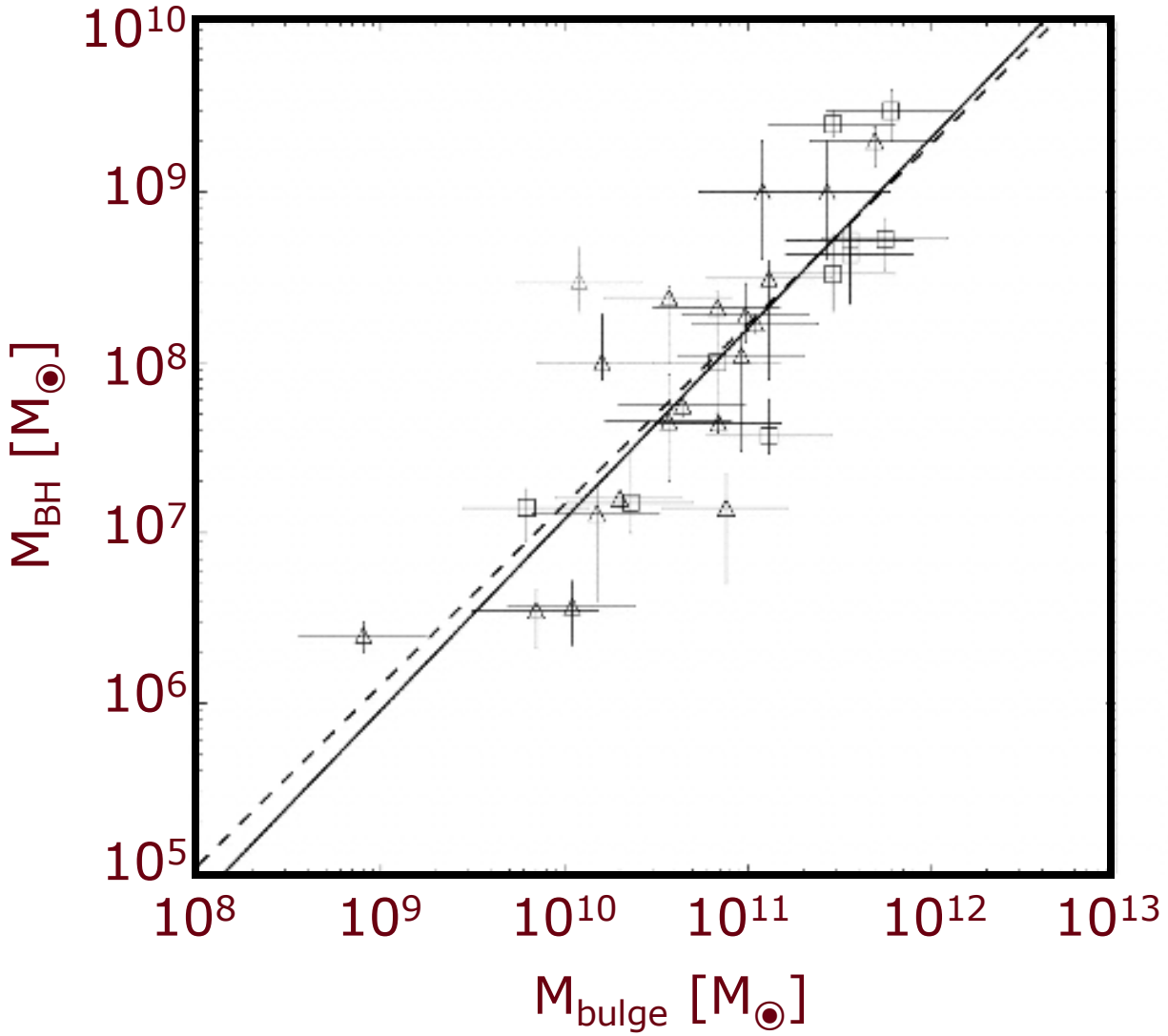
MUNI Masaryk University

An active galactic nucleus is a rapidly growing supermassive black hole.



Urry & Padovani (1995)

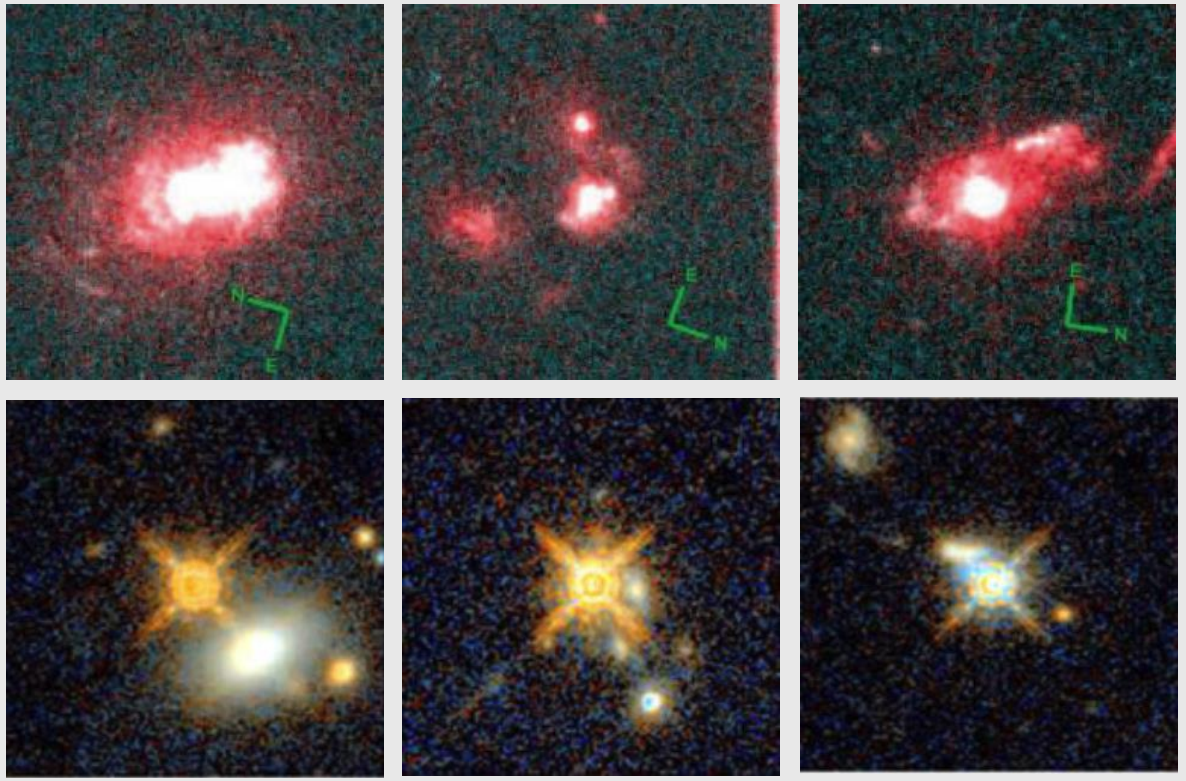
M_{BH} correlates with bulge stellar mass which, in ellipticals, is equivalent to total stellar mass.



Häring & Rix (2004)

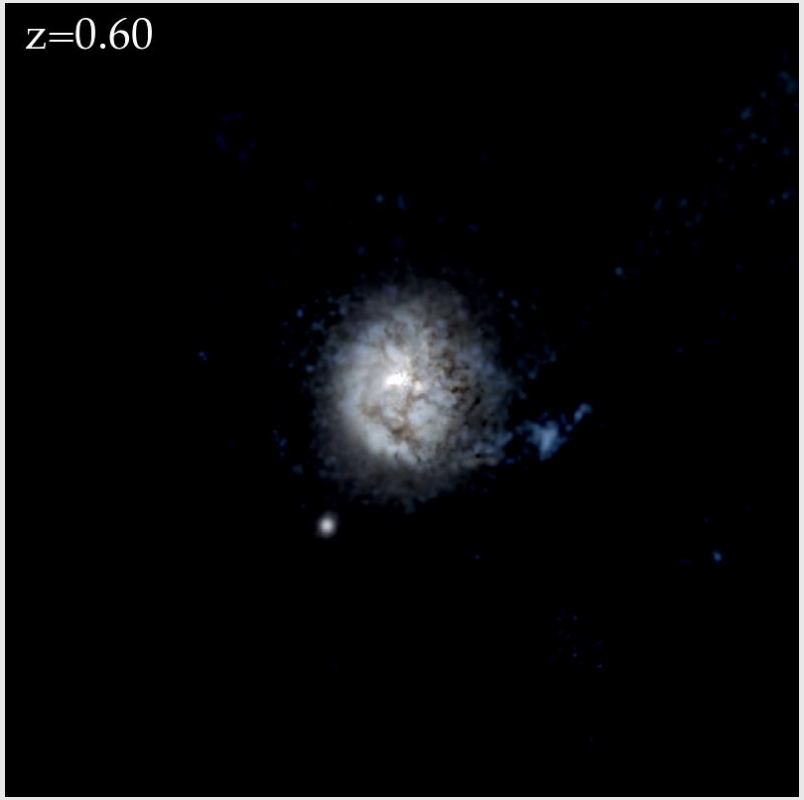
Mergers are one cause of co-evolution.

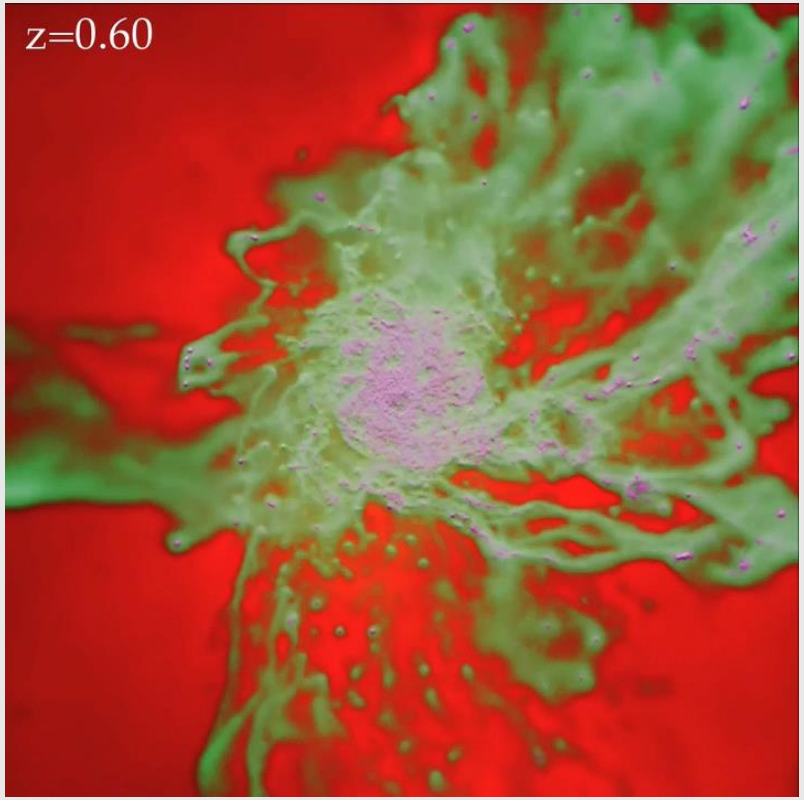
V. Springel / MPIA



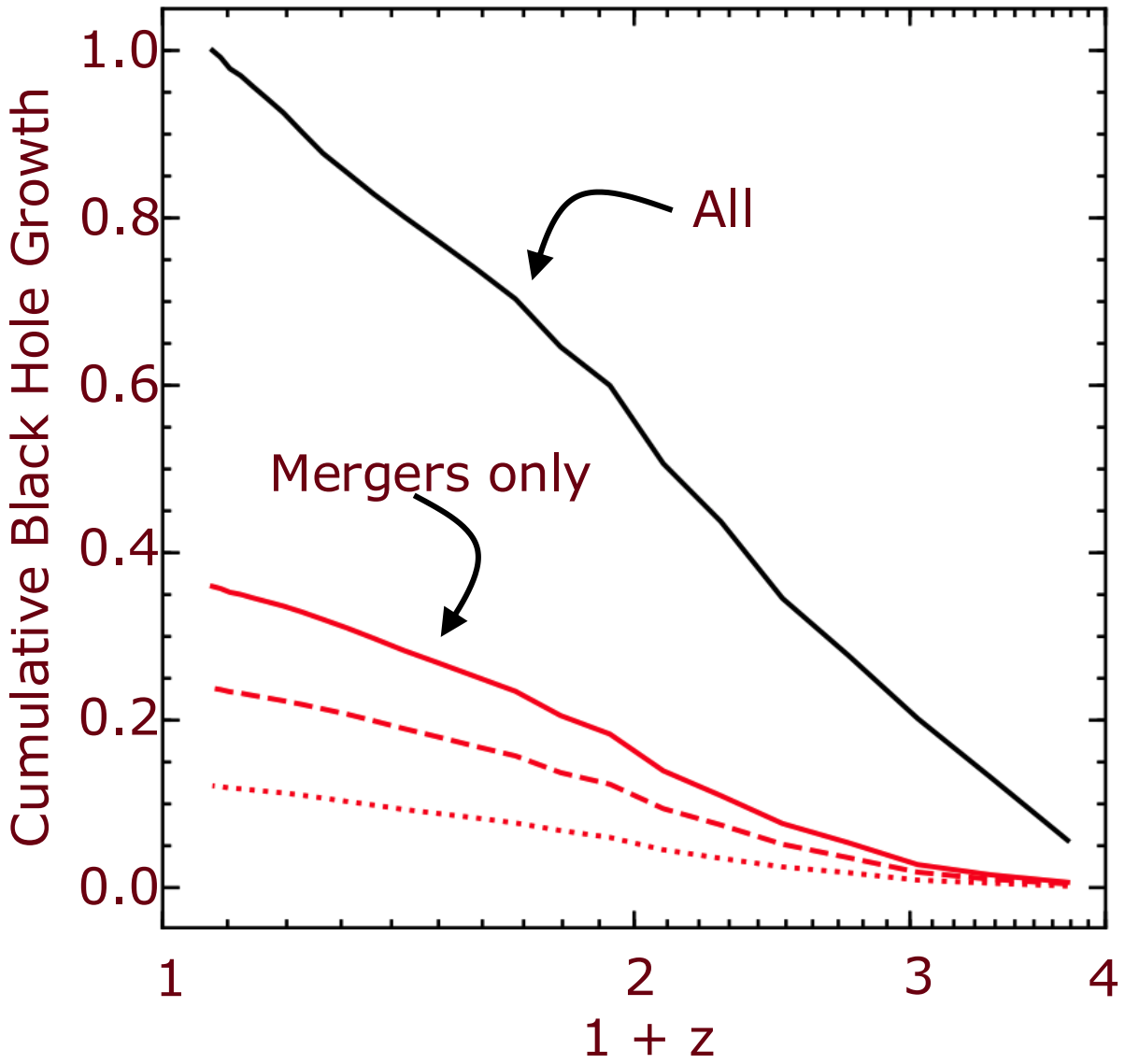
Urrutia+08
Glikman+15

Disk-dominated galaxies have merger free histories.



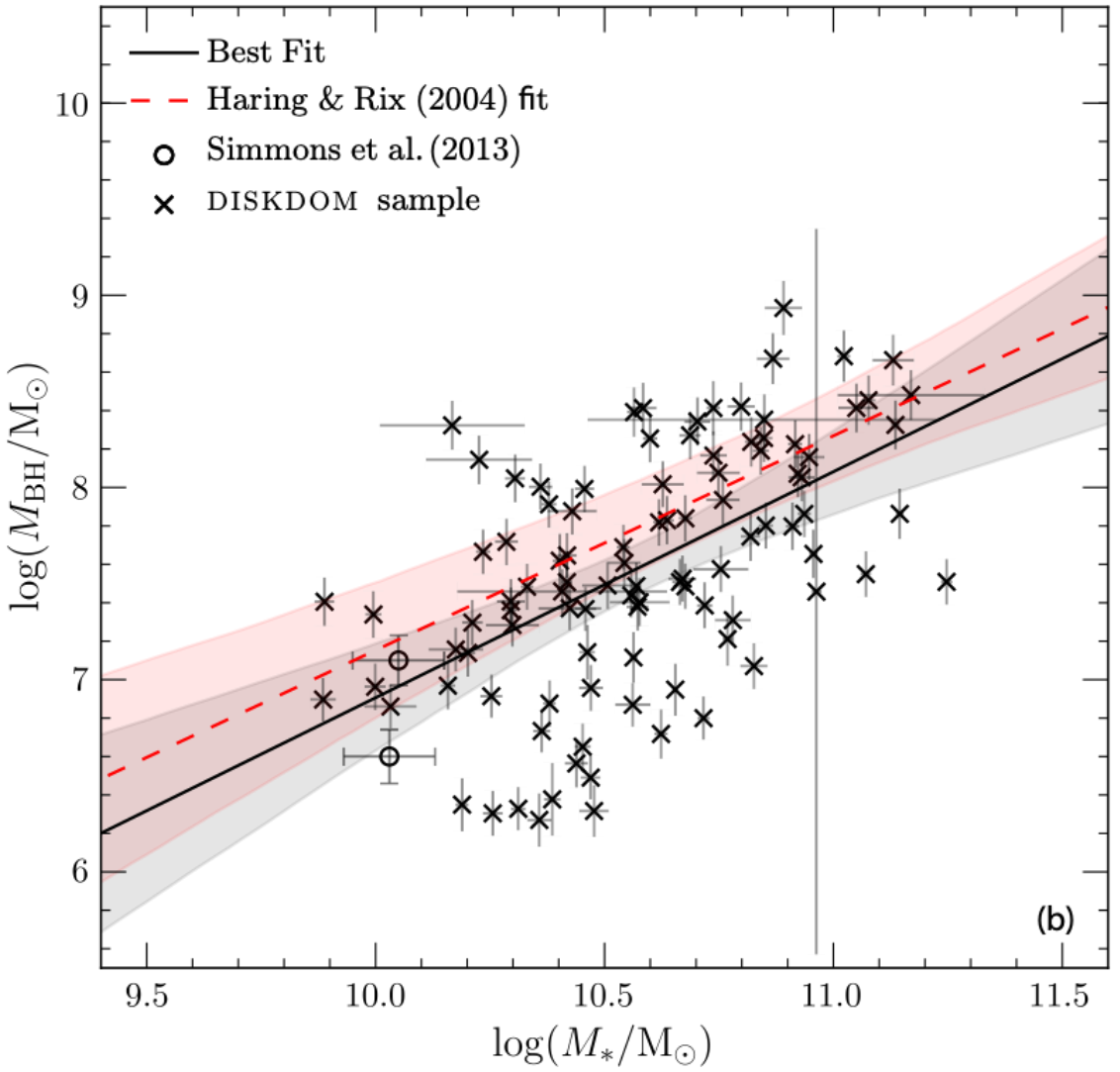


Most SMBH growth occurs via merger-free mechanisms.



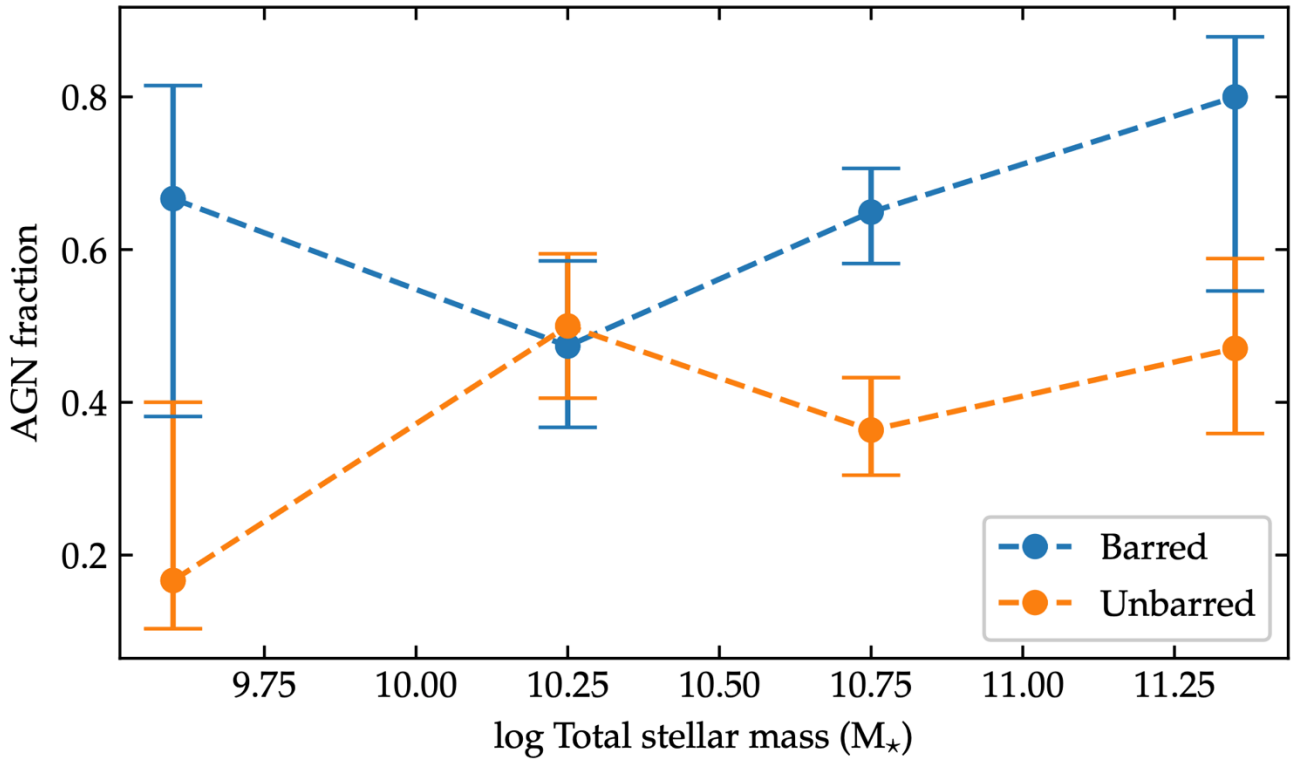
Martin+18

Merger-free growth is consistent with merger-driven growth.



Simmons, Smethurst & Lintott (2017)

Contention in previous studies looking at AGN-bar link



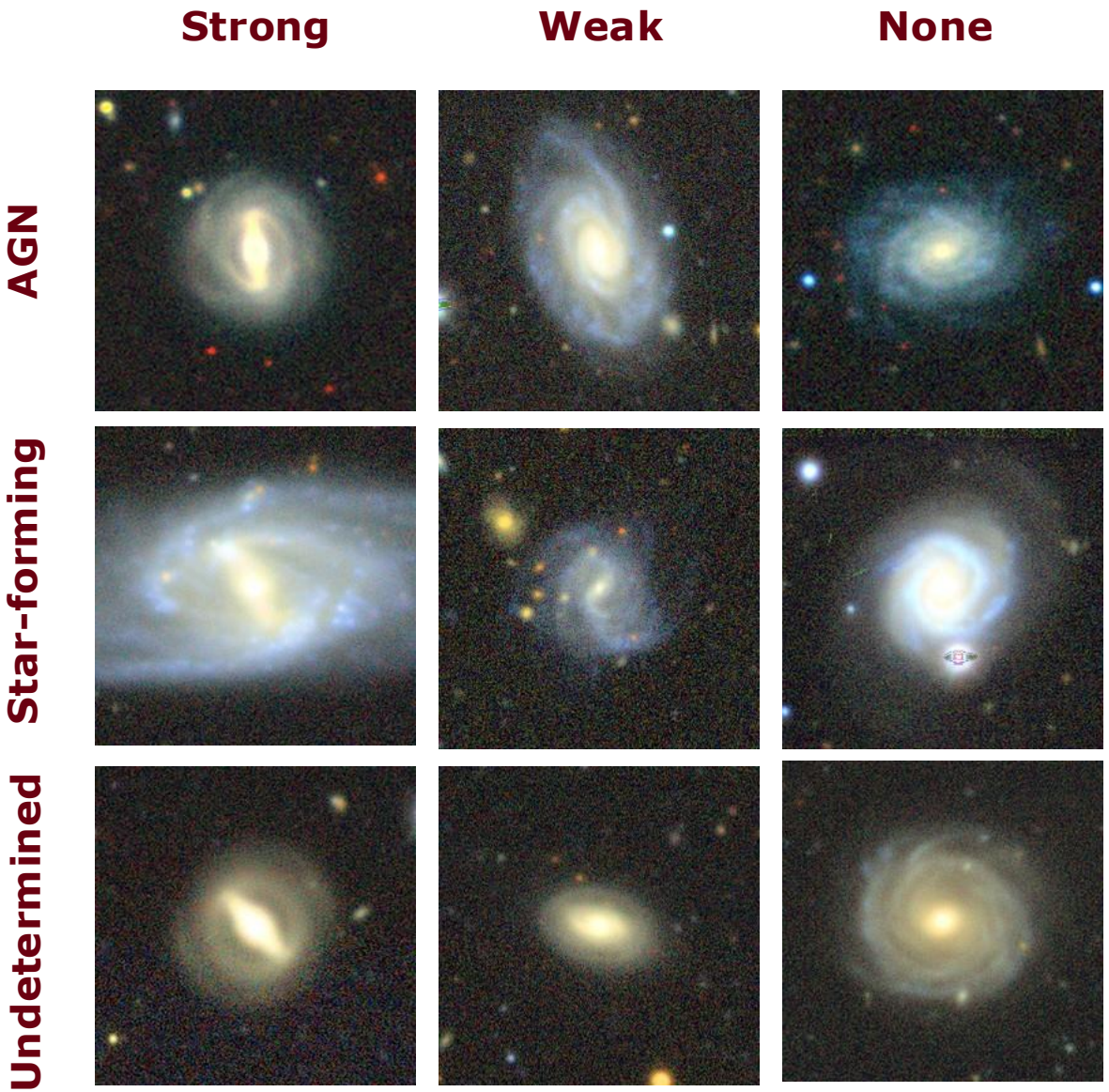
Silva-Lima+22

AGN host bar fraction: 59 ± 8 %

Inactive bar fraction: 44 ± 8 %

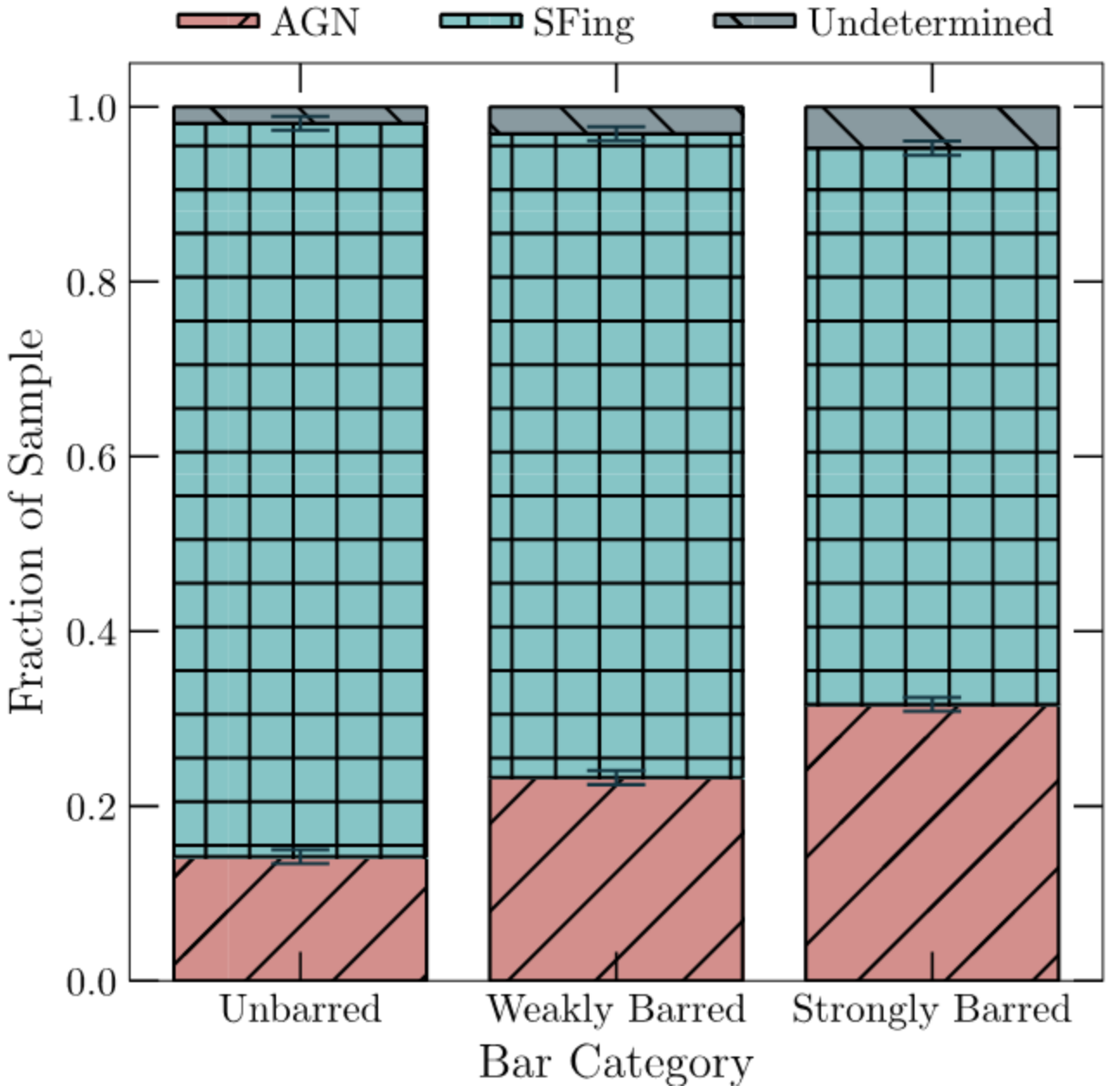
Garland+23

GZ DESI contains 3.8k AGN and 57.4k inactive galaxies in our volume limited sample.



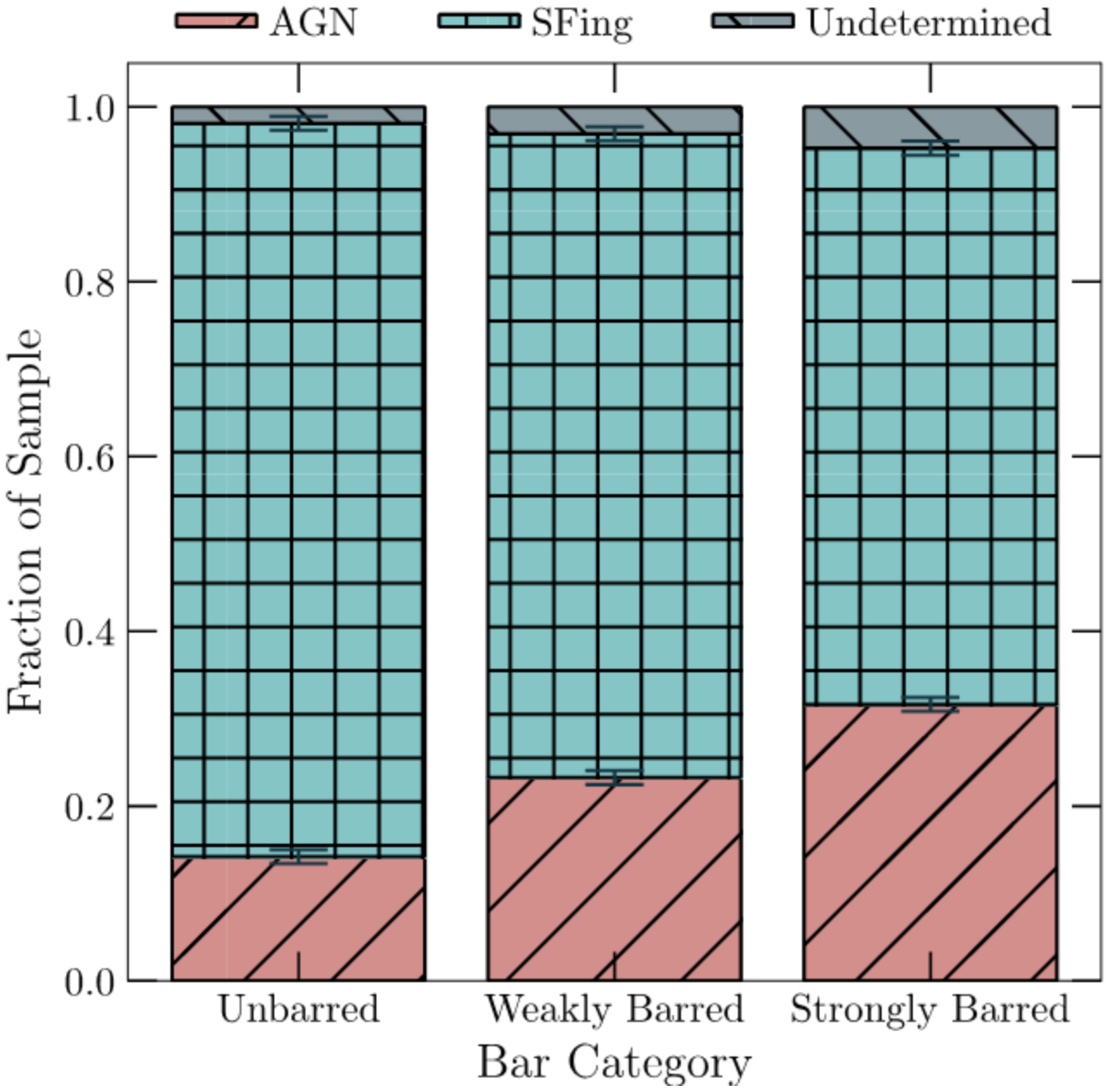
Walmsley,…,Garland+23
Garland+24

Strongly barred galaxies most likely to host AGN



Garland+24

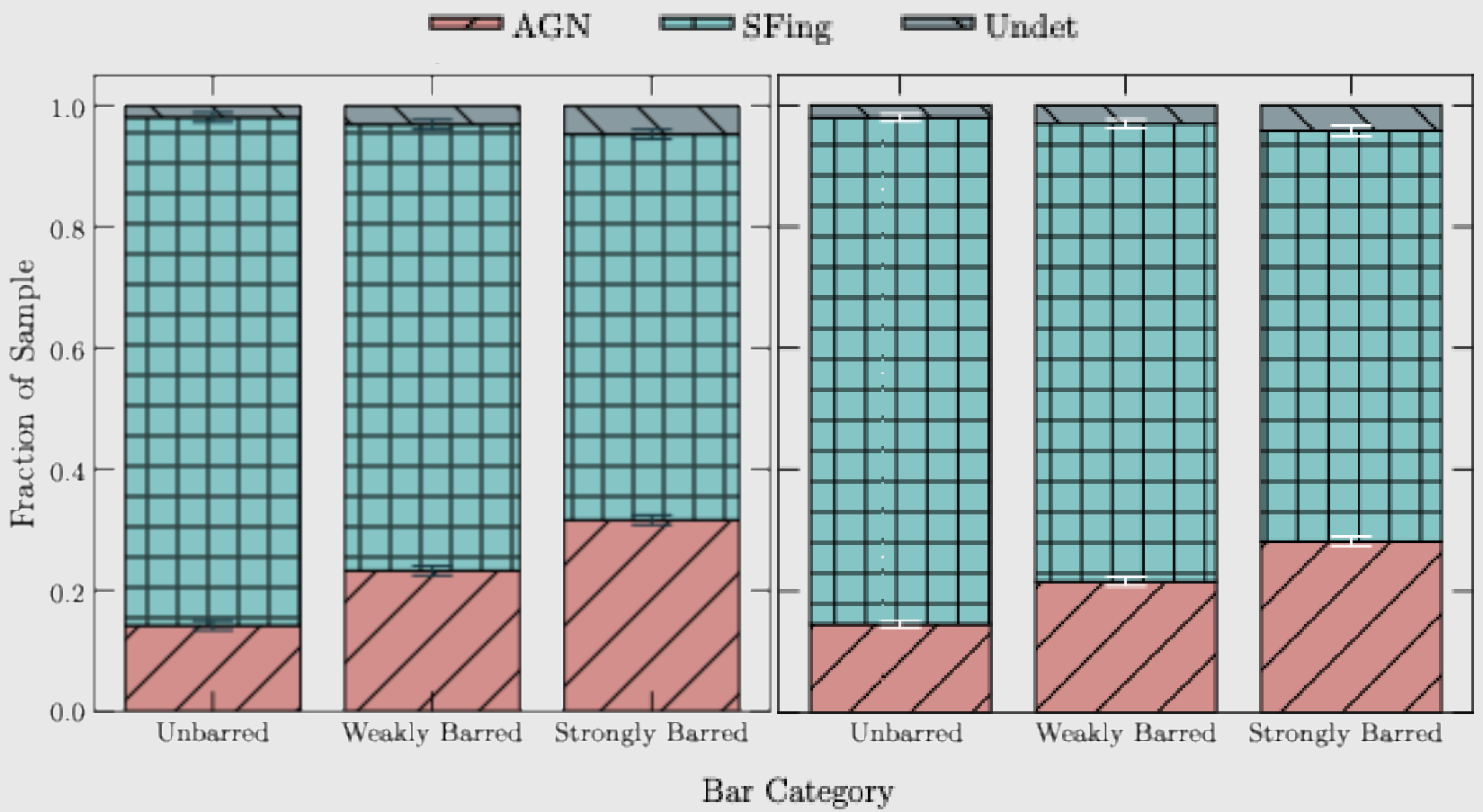
Strongly barred galaxies most likely to host AGN



Garland+24

We control for bulge prominence, and compare the AGN fractions to previous results

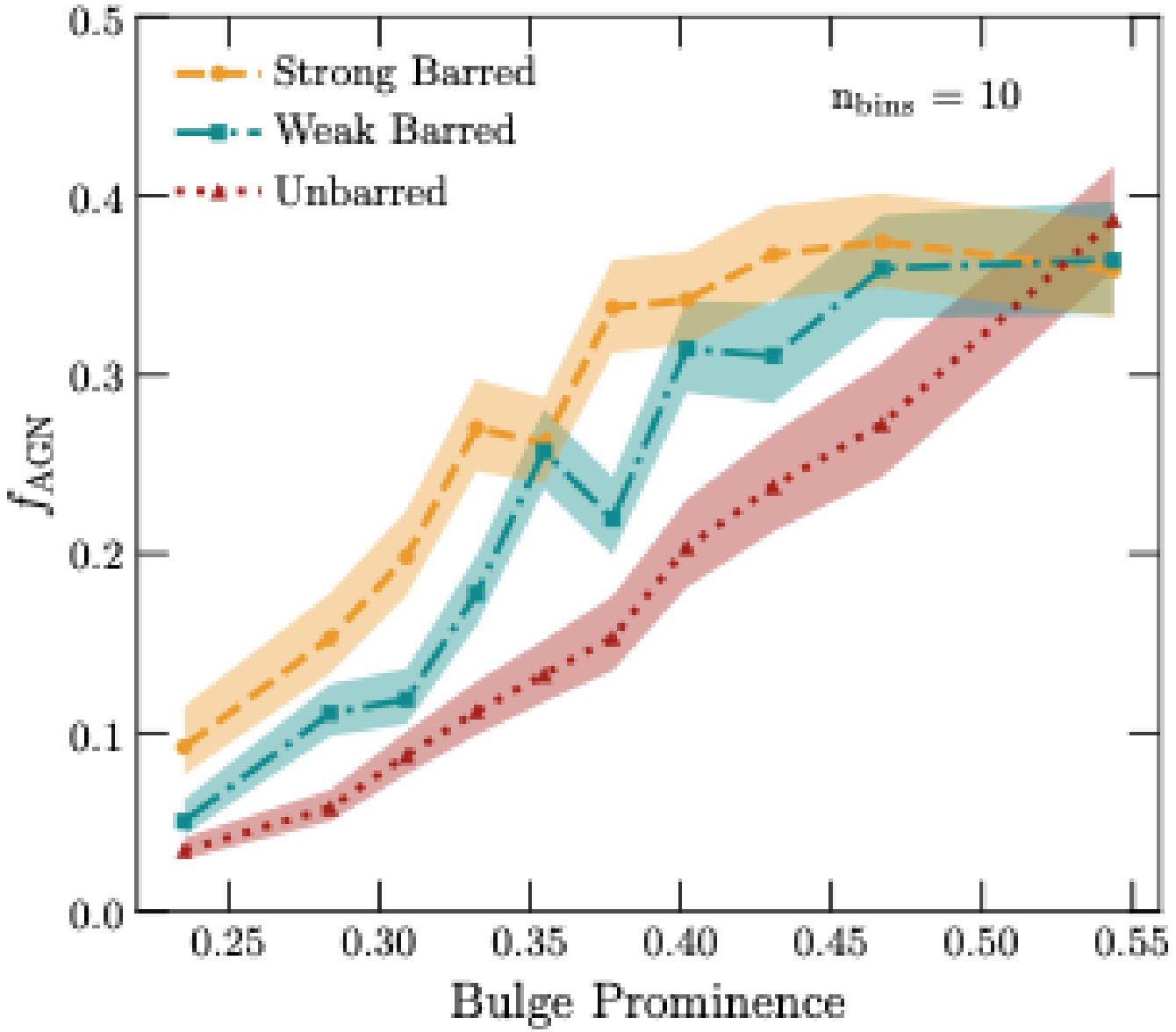
Stellar mass & colour controlled <u>only</u>



Stellar mass, colour & <u>bulge</u> controlled

Garland+ (in prep.)

The AGN fraction increases with both bulge prominence and bar strength



Garland+ (in prep.)

Take home points

- **Merger-free BH growth is poorly understood.**
- **Strongly barred galaxies more likely to host an AGN than weakly barred, which are in turn more likely than unbarred**

Izzy Garland

@izgarland.bsky.social

garland@mail.muni.cz