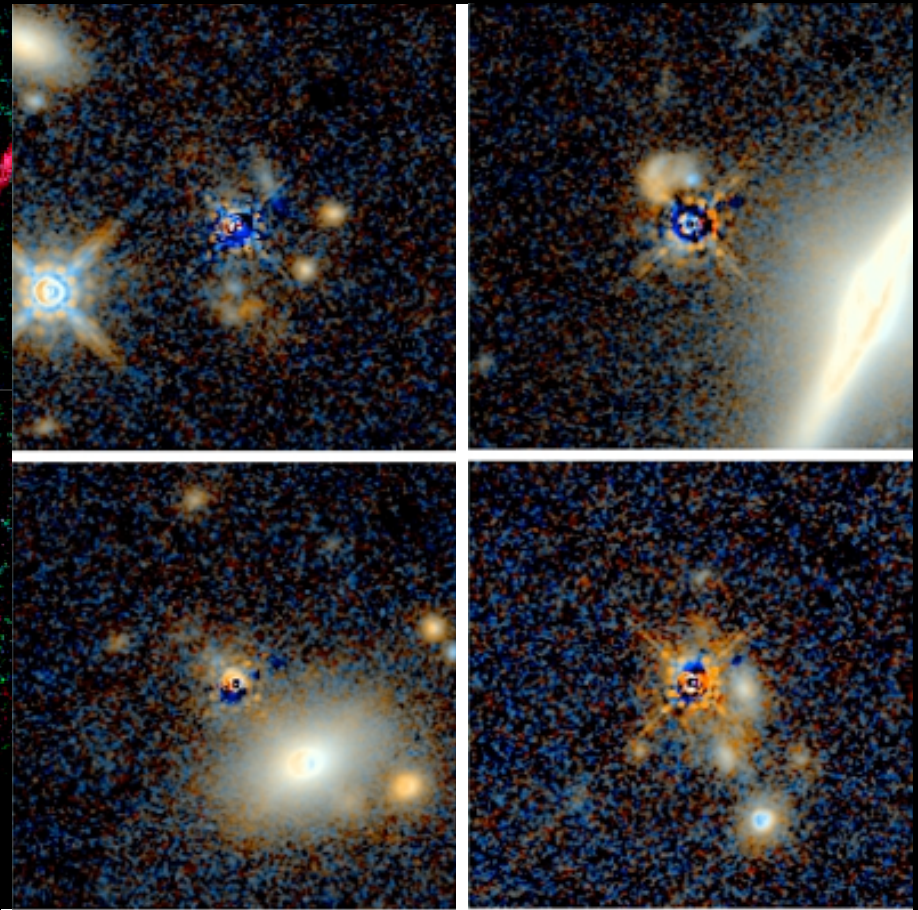
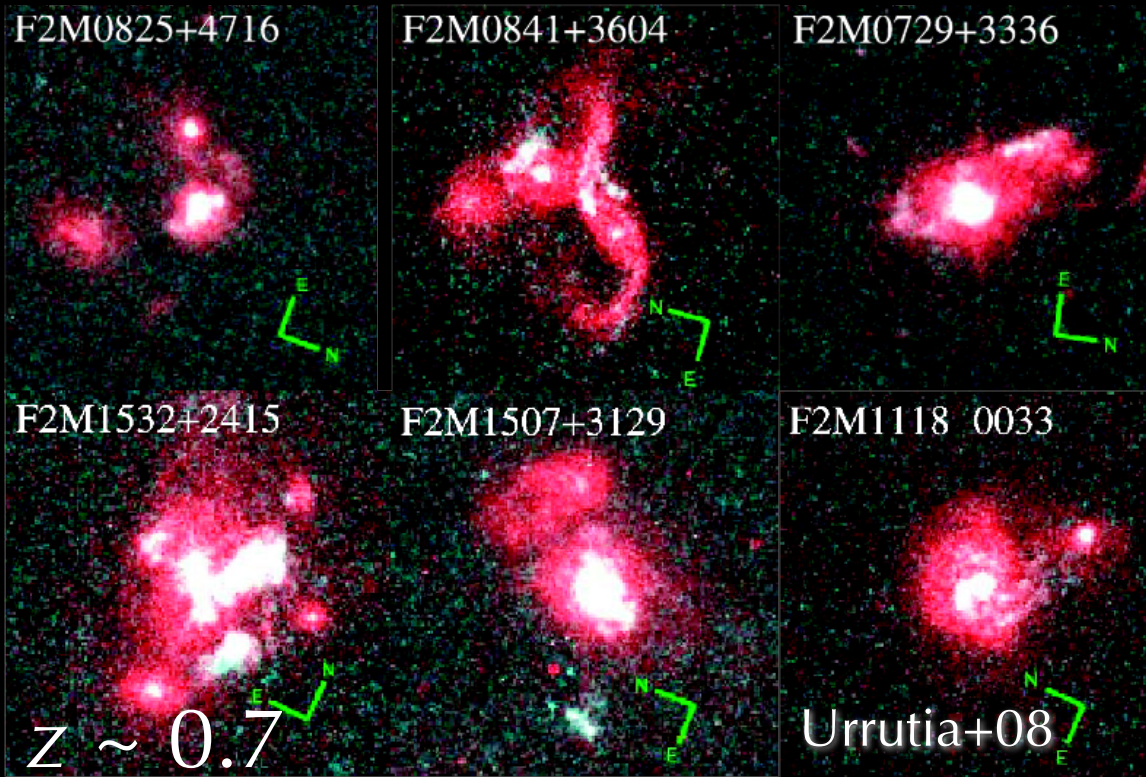


The Merger-Free Growth of Supermassive Black Holes and their Host Galaxies

Brooke Simmons
UC San Diego

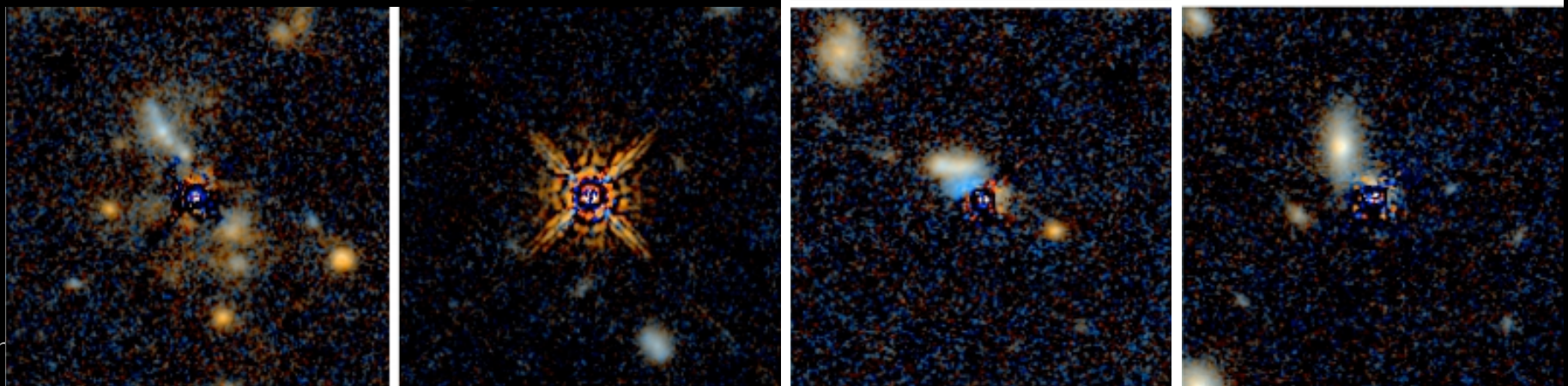
Simmons, Smethurst & Lintott (2017)

Do Mergers Drive Co-Evolution?



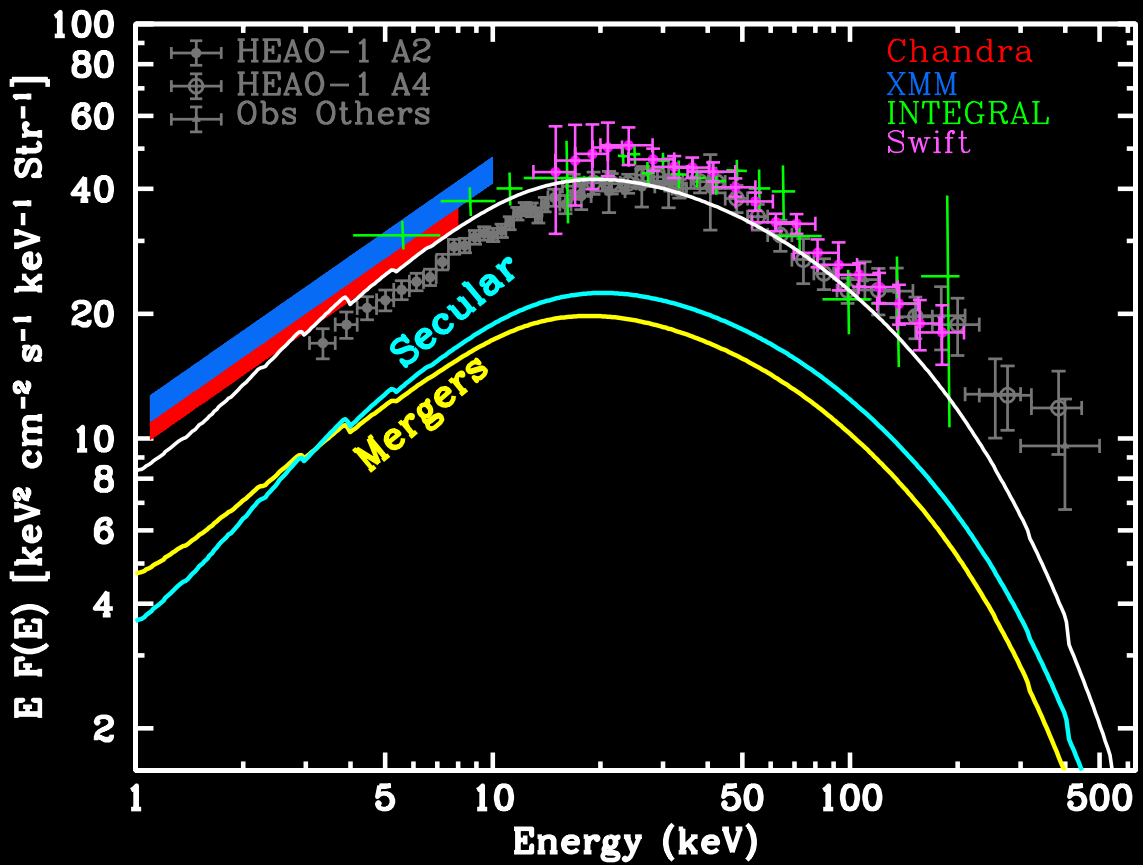
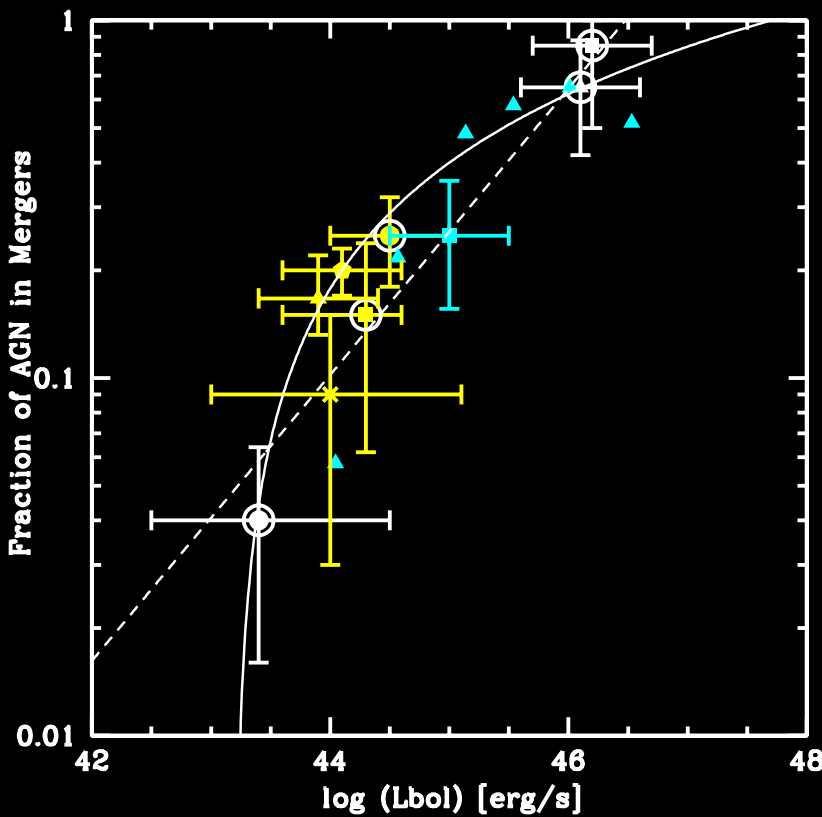
$z \sim 2$

Glikman, Simmons+ 15



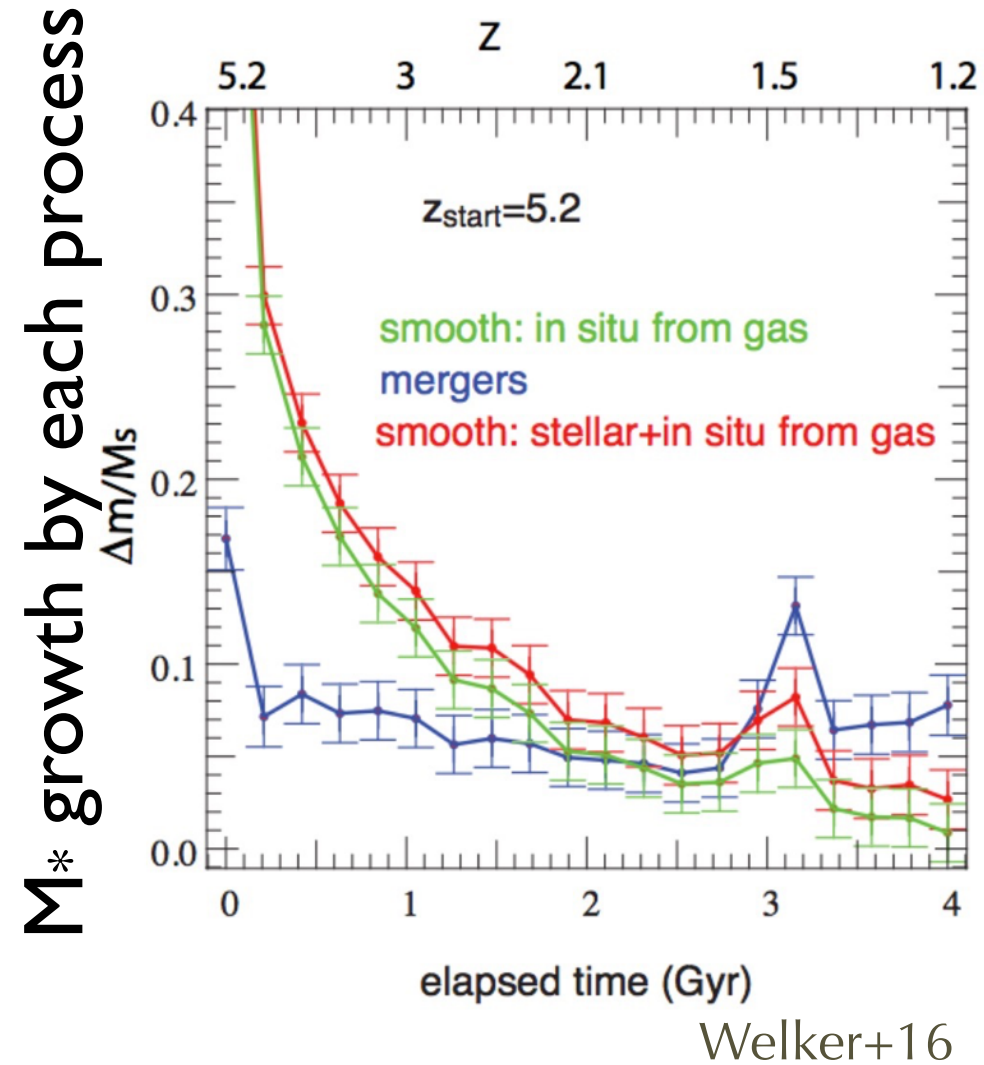
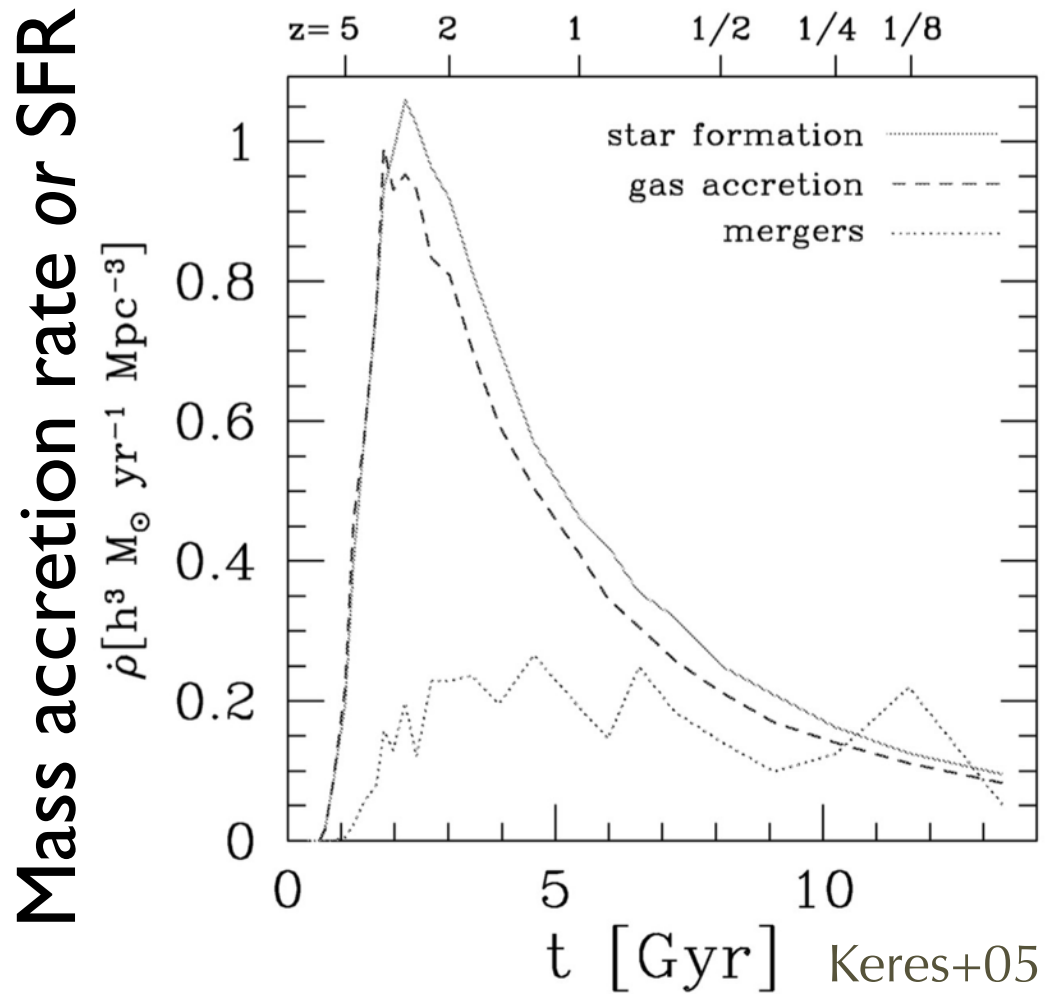
B. Simr

Major Mergers & SMBHs: Only Half the Story

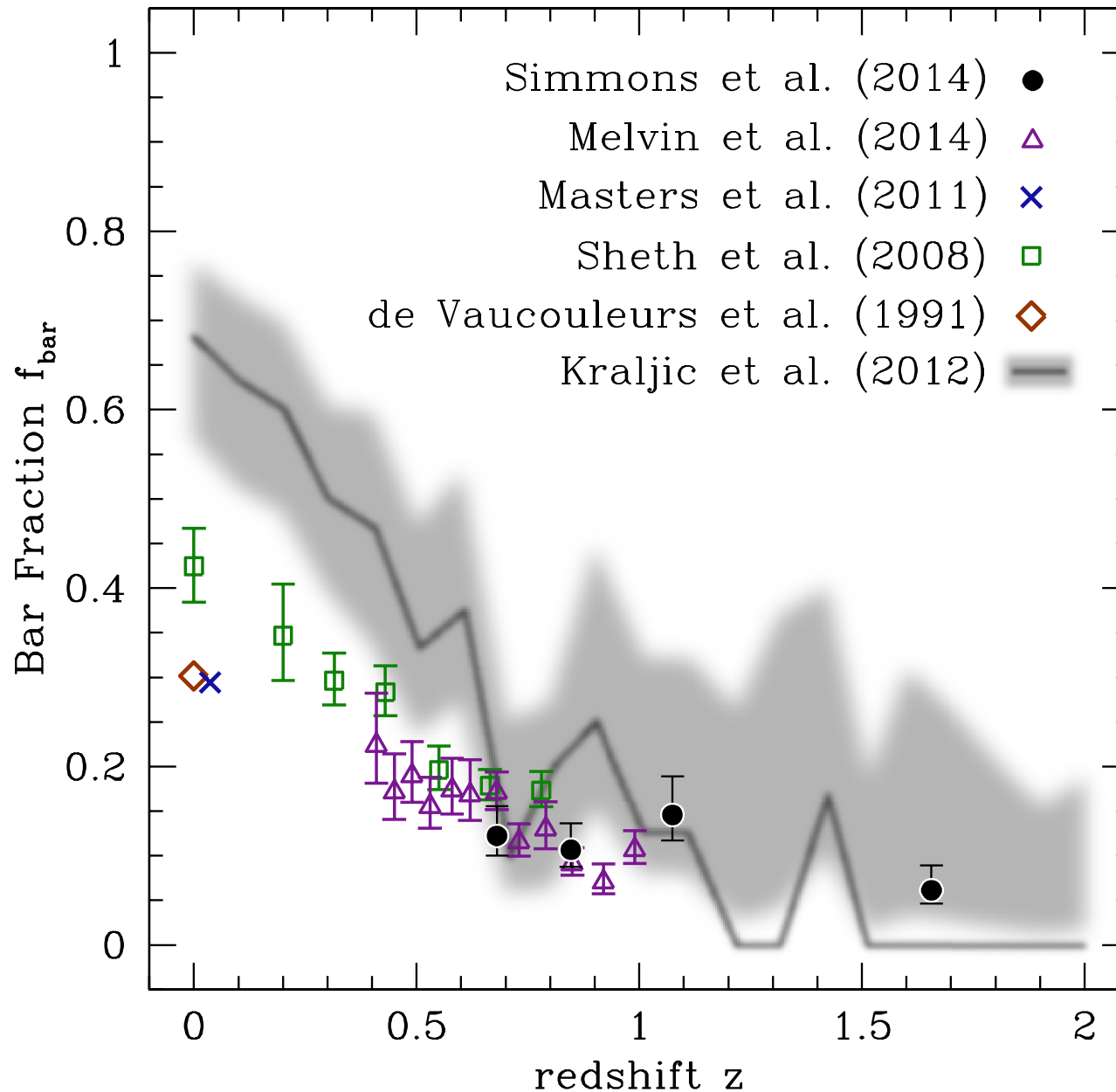


Treister+12

Merger-Free galaxy growth: cold accretion



Populations of settling disks since $z \sim 2$



Disentangling growth histories

Morphologies

Bulgeless

“Pseudo”-bulge

“Classical” bulge

Evolutionary Processes

Calm Merger-Free:
No dynamical heating



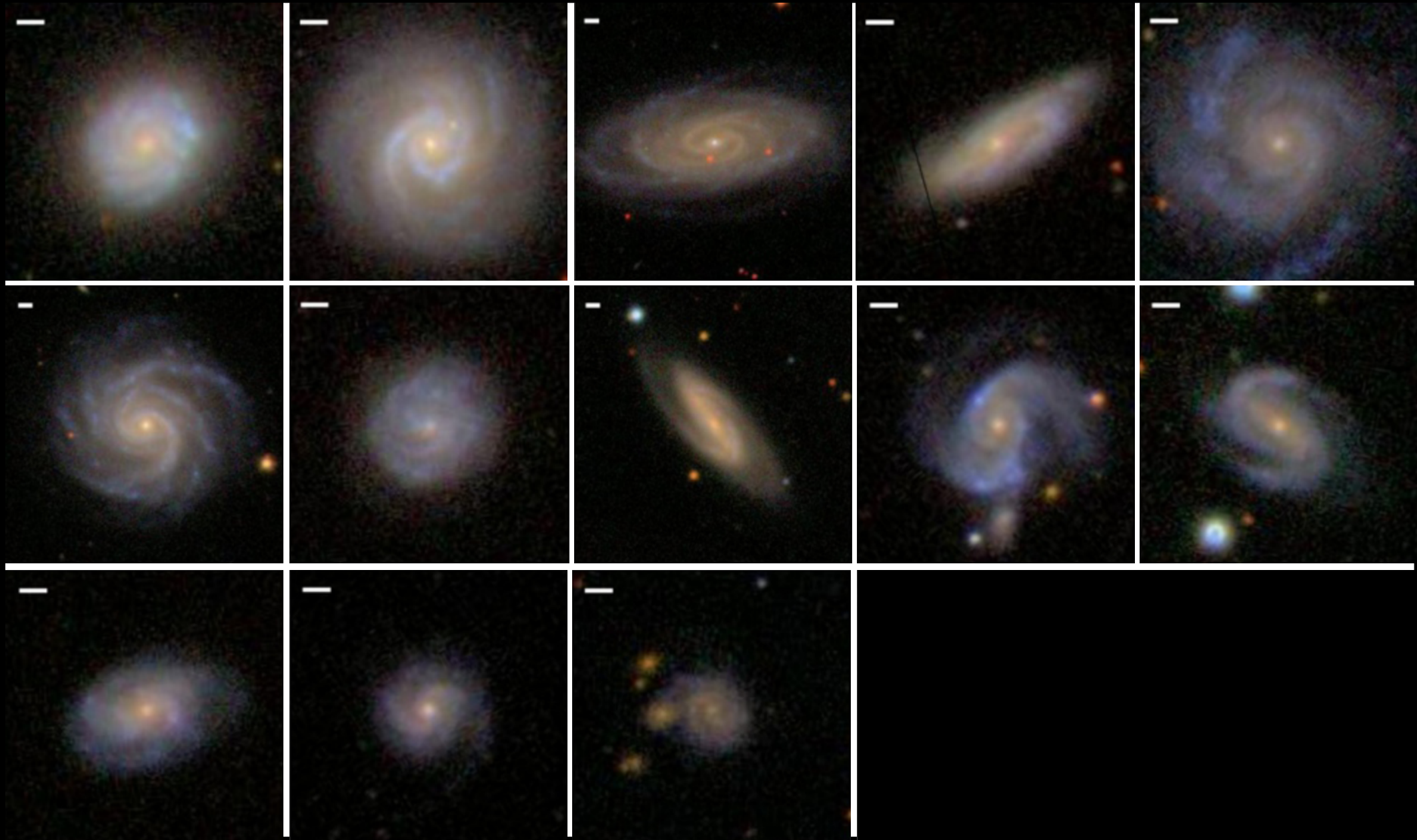
Violent Merger-Free:
Some dynamical heating



Merger-driven:
Significant dynamical heating



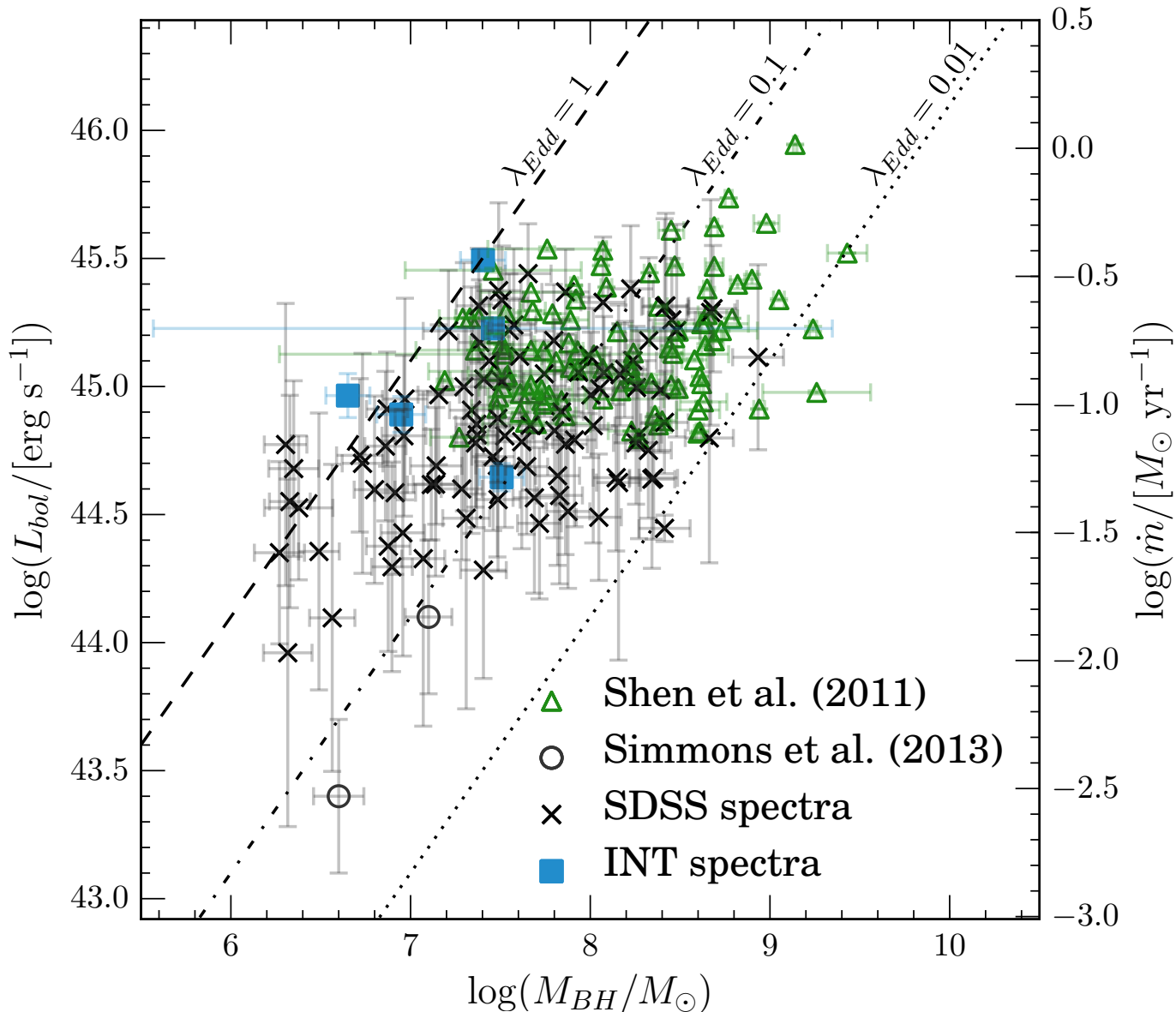
Bulgeless Galaxies with Growing Black Holes



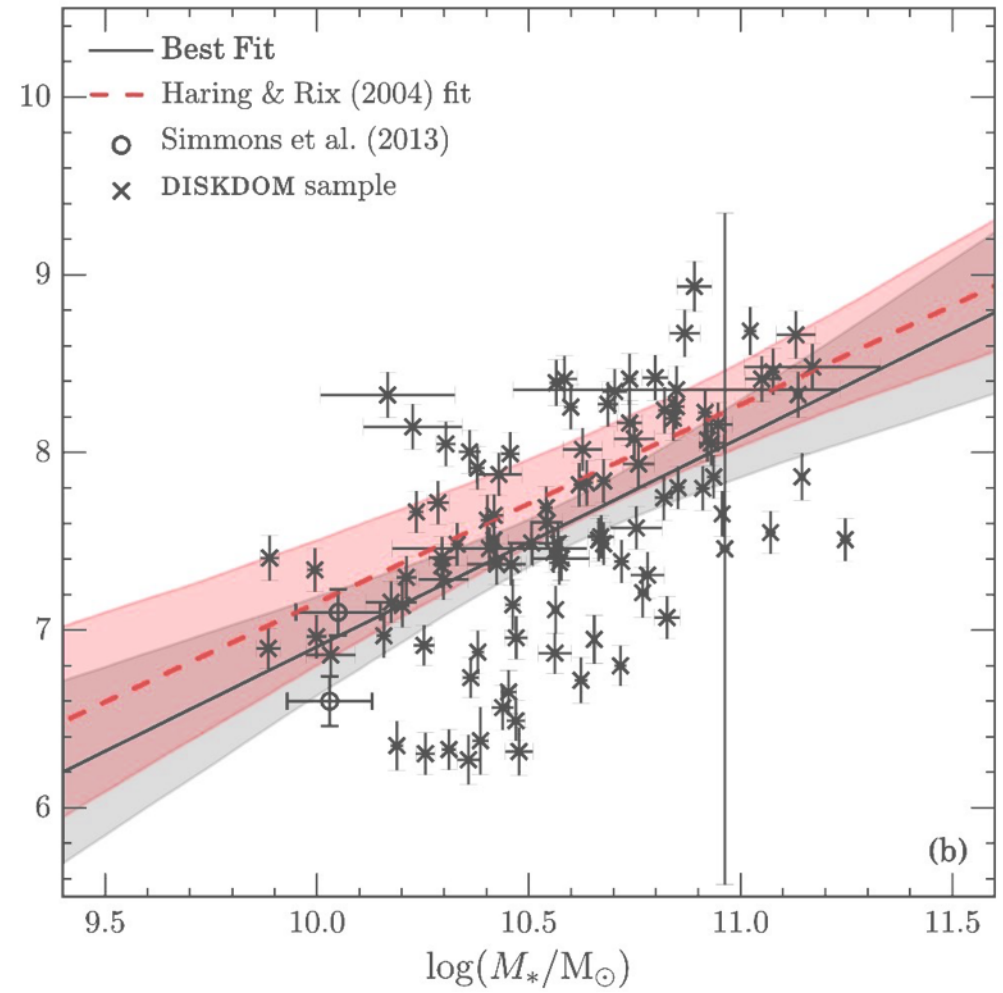
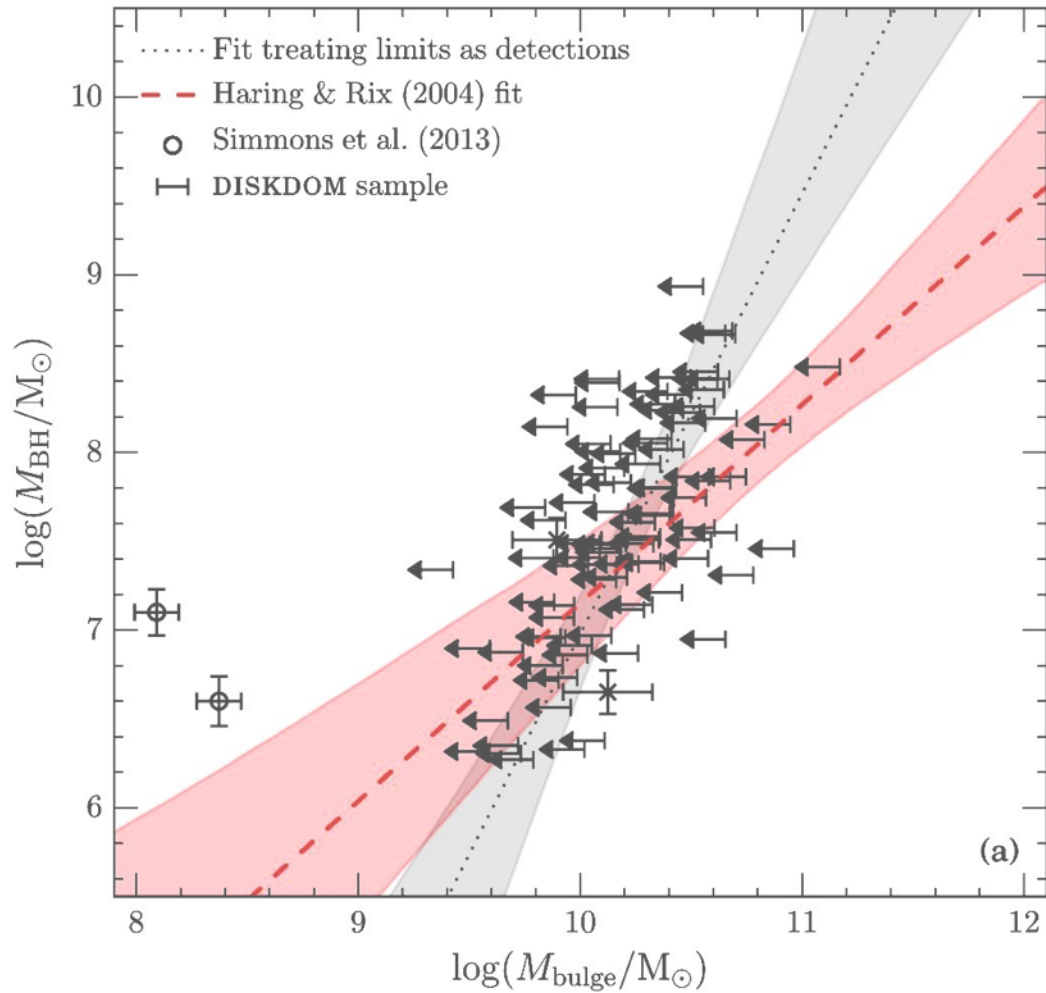
Merger-Free AGN & Host Galaxies



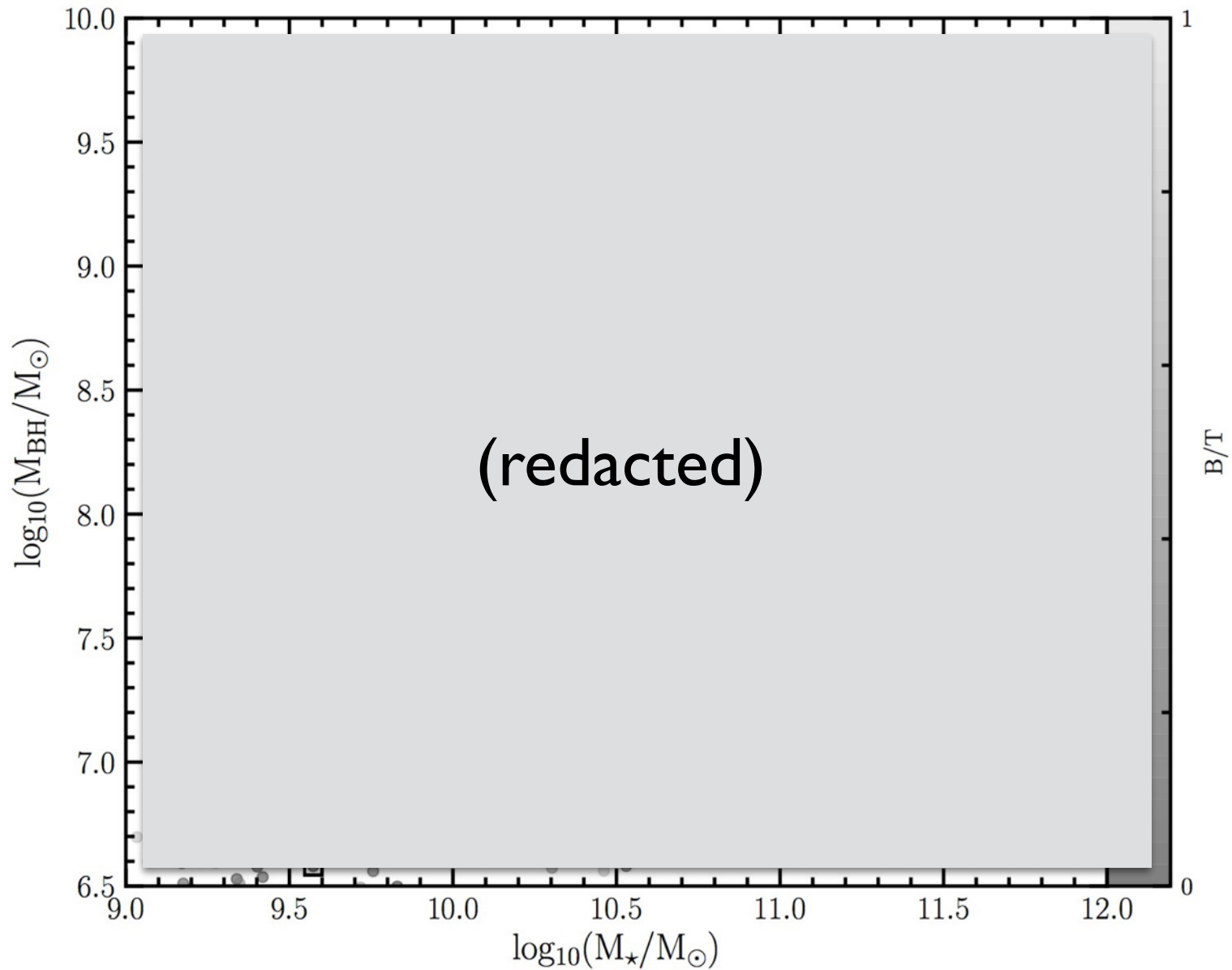
Merger-Free Black Hole Growth



Merger-Free AGN & Host Galaxies

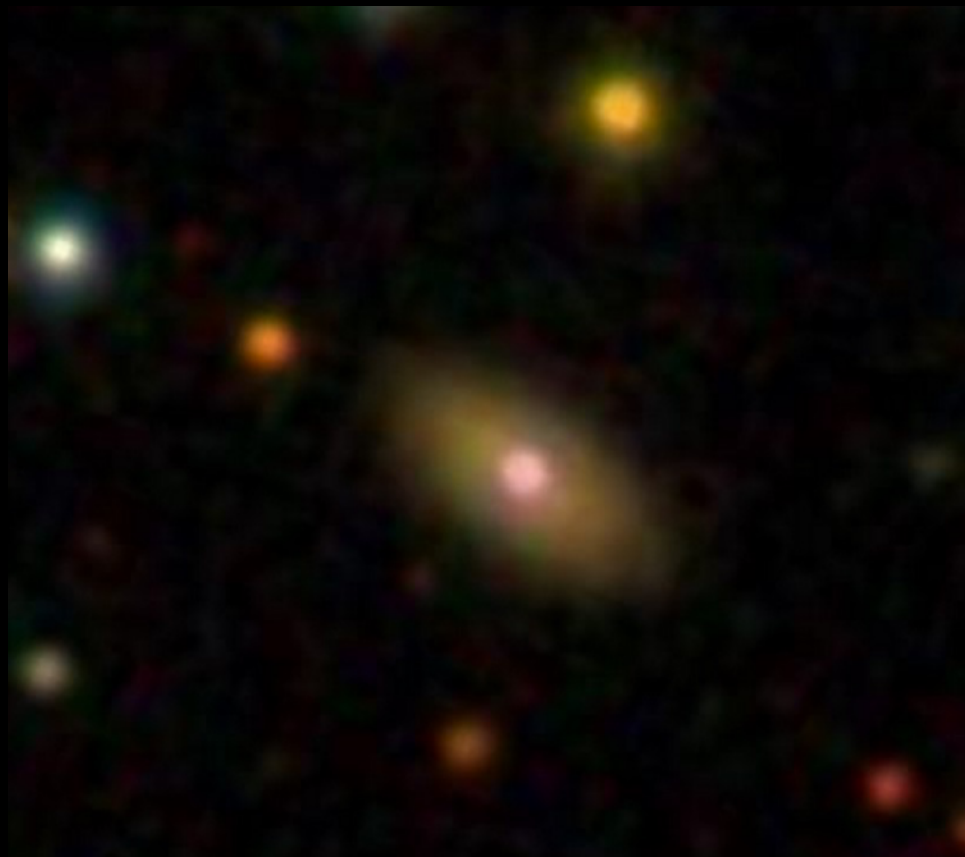


Mergers & Co-Evolution, in Theory



Fresh Off The Telescope

(this time last year)

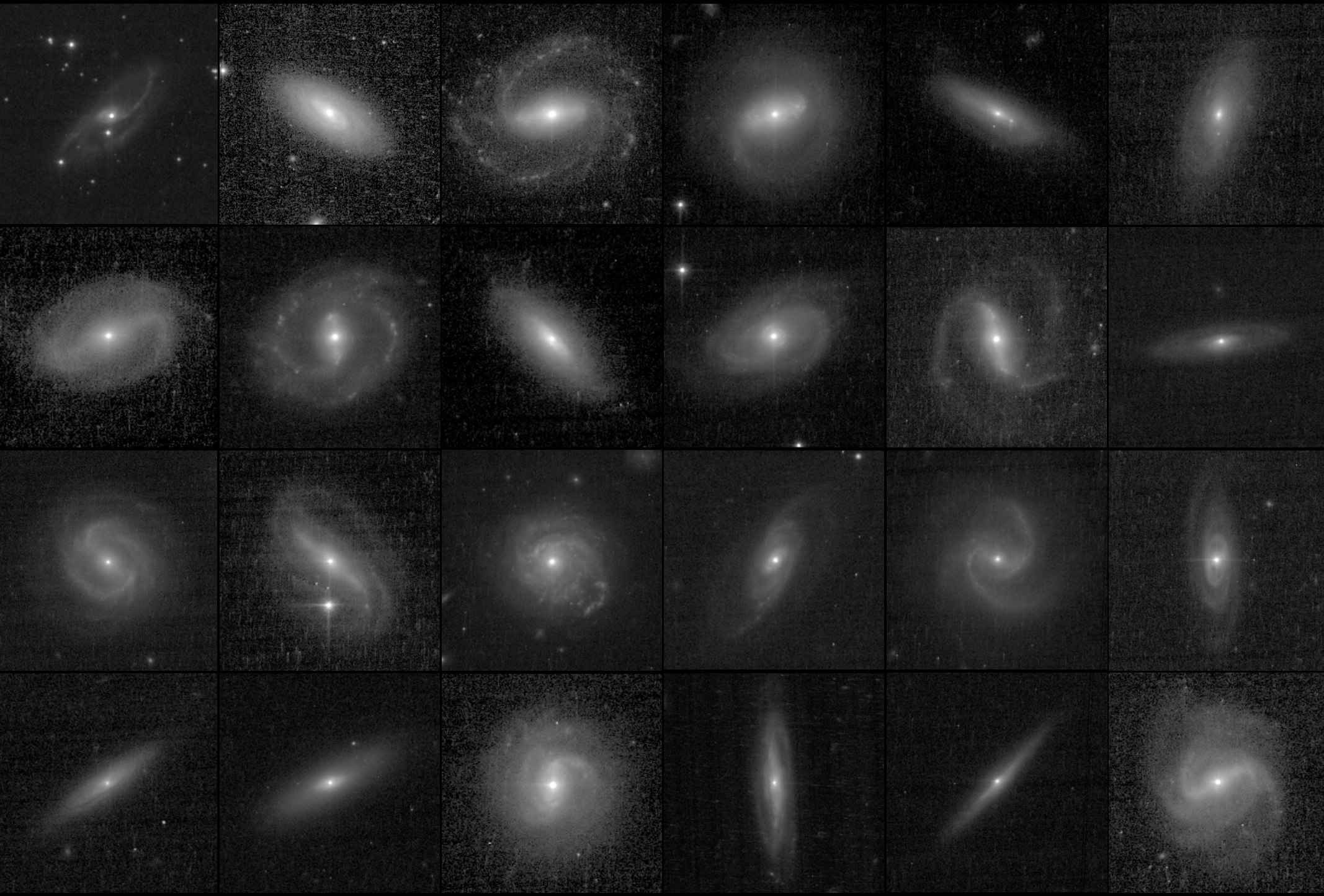


SDSS *gri*



HST F814W

MAGNUS: the Merger-free AGN hubble Survey



Morphology tells a tale of formation history

Morphologies

Bulgeless

“Pseudo”-bulge

“Classical” bulge

Evolutionary Processes

Calm Merger-Free:
No dynamical heating



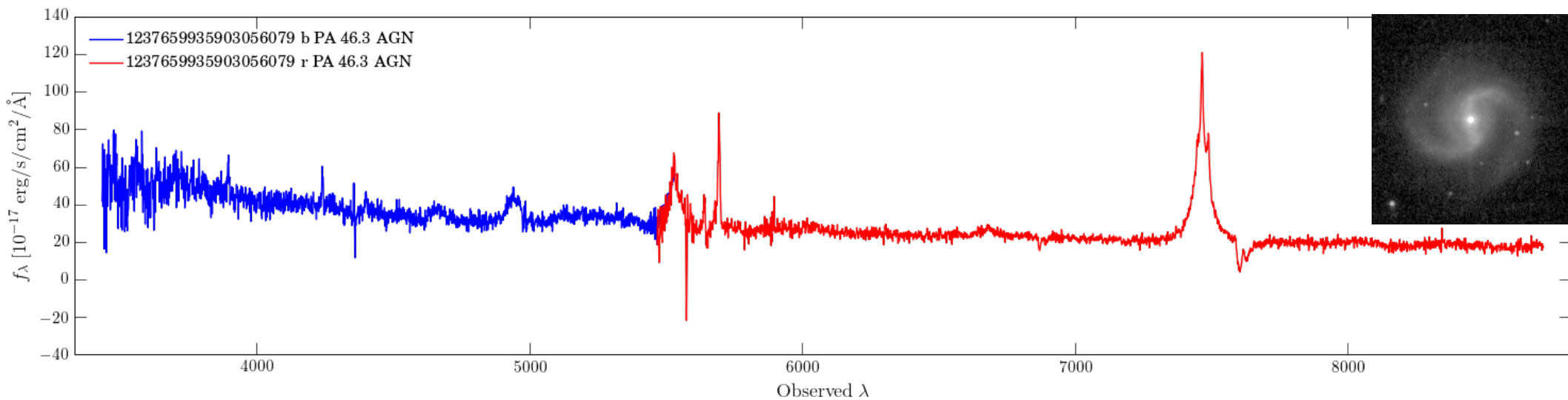
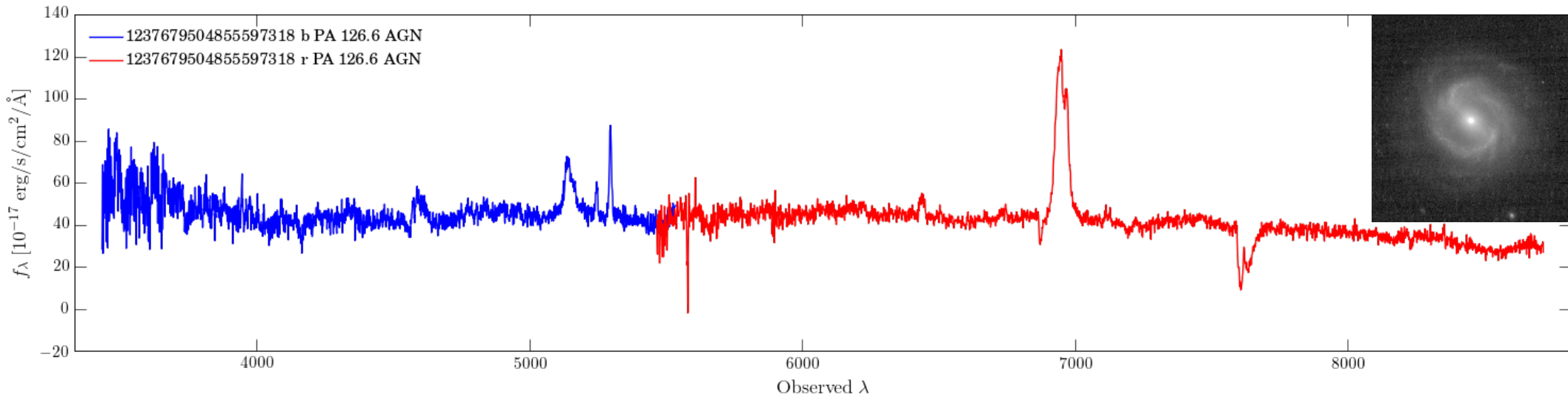
Violent Merger-Free:
Some dynamical heating



Merger-driven:
Significant dynamical heating

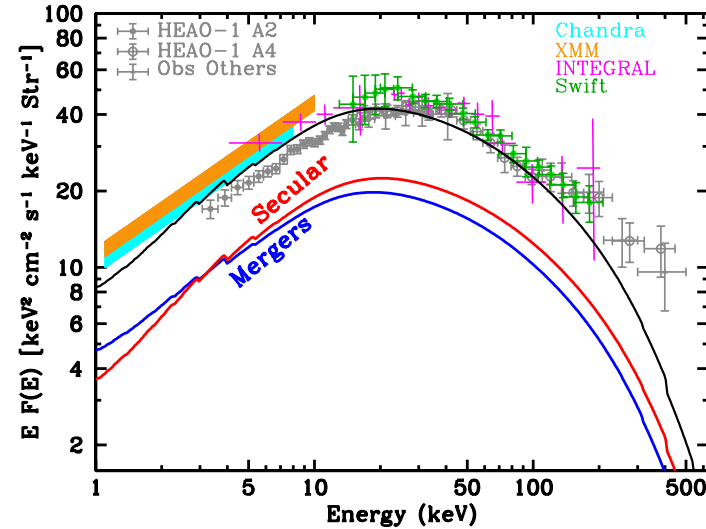
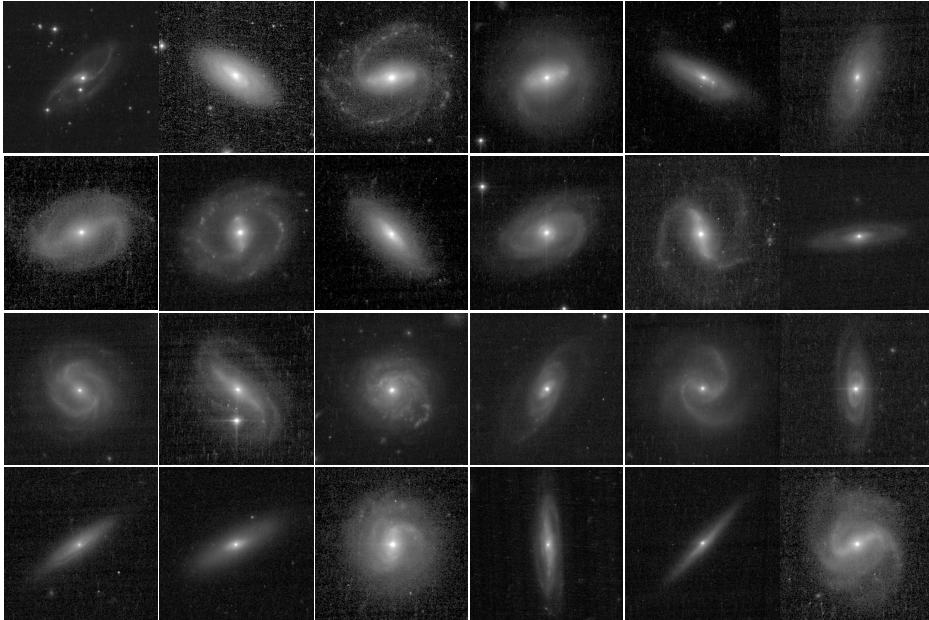


BH + Galaxy Information



Summary

Substantial BH growth occurs in the absence of mergers.



Merger-free BHs co-evolve with galaxies: co-evolution must be more fundamental than mergers.

