STELLAR KINEMATICS OF GALAXIES ON THE STAR-FORMING MAIN SEQUENCE:

A SAMI and MaNGA view

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Background

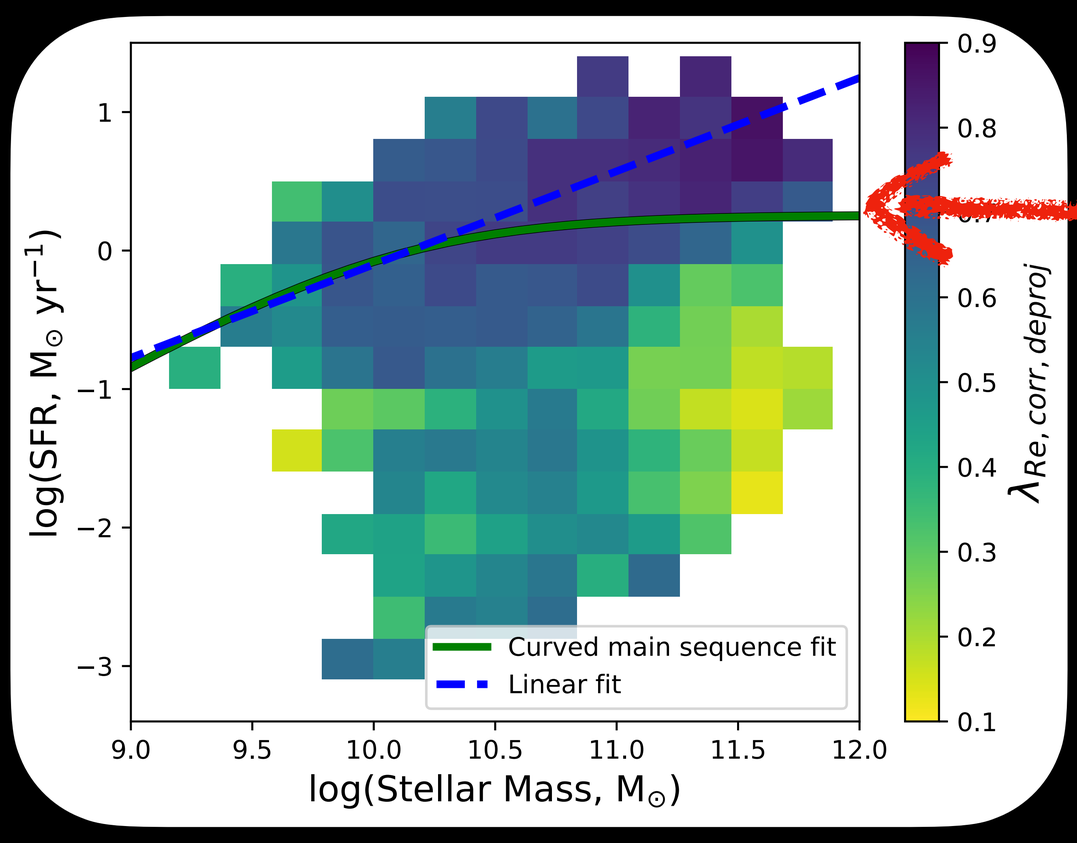
Passive galaxies generally contain significant central mass concentrations, leading us to question whether bulges are involved in the quenching of star formation in galaxies. We examine this from a kinematic standpoint using the spin parameter, λ_{Re}.

Data

897 gals + 2392 gals

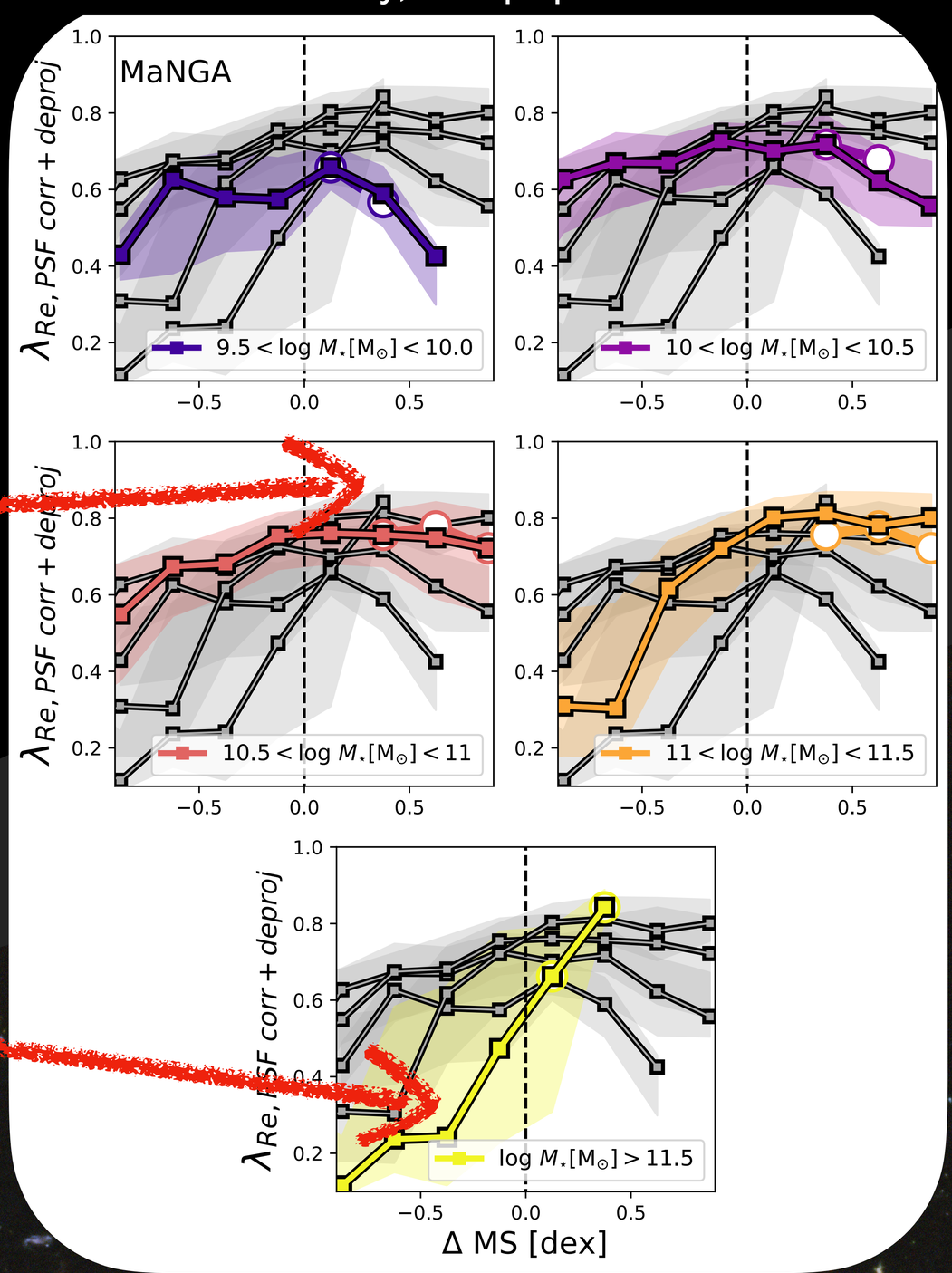
$$\lambda_{Re} \sim \frac{\text{Rotation support}}{\text{Dispersion support}}$$

Results



Evidence for tantalising phenomenological connection between the bending of the star-forming main sequence (SFMS) line and an increase in dispersion support. Is this evidence of bulges quenching galaxies?

MaNGA data only, see paper for SAMI results



No evidence of a decrease in λ_{Re} above the SFMS (once mergers are removed) ➔ No growth of dispersion-dominated components (e.g. classical bulges) while galaxies are in a starburst phase.

Two different quenching paths based on stellar mass?
We see a rapid decrease in λ_{Re} below the SFMS for high-mass galaxies. Similarly passive low-mass galaxies retain their rotation support.
Low-mass galaxies quench without structure growth, while some mechanism quenches star formation AND dramatically alters stellar kinematics at high stellar mass. The likely culprit is gravitational interactions.

Reference

Fraser-McKelvie et al. 2021, MNRAS 'A SAMI and MaNGA view on the stellar kinematics of galaxies on the star-forming main sequence' https://ui.adsabs.harvard.edu/abs/2021MNRAS.tmp..596F/abstract

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ICRAR International Centre for Radio Astronomy Research