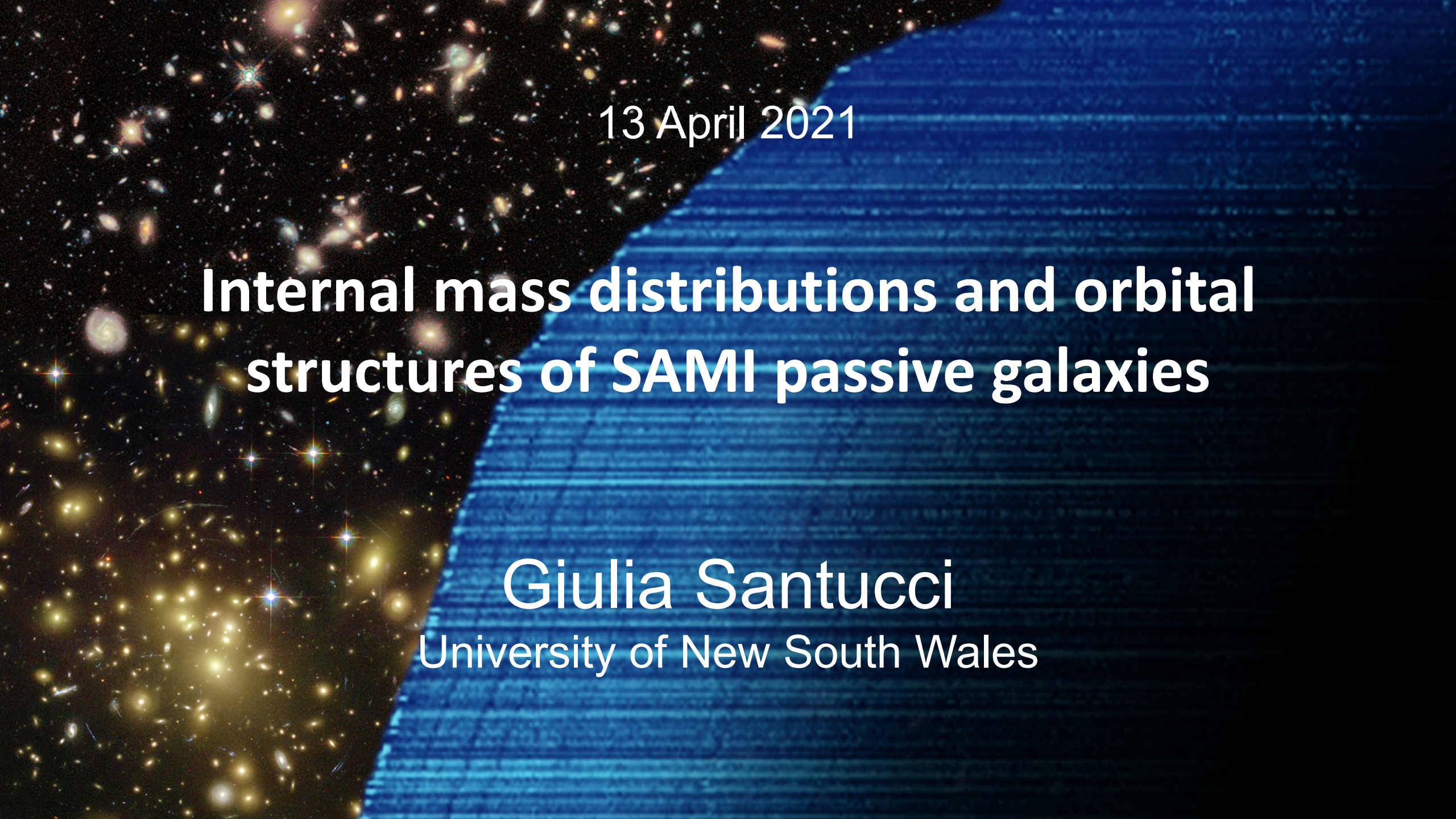
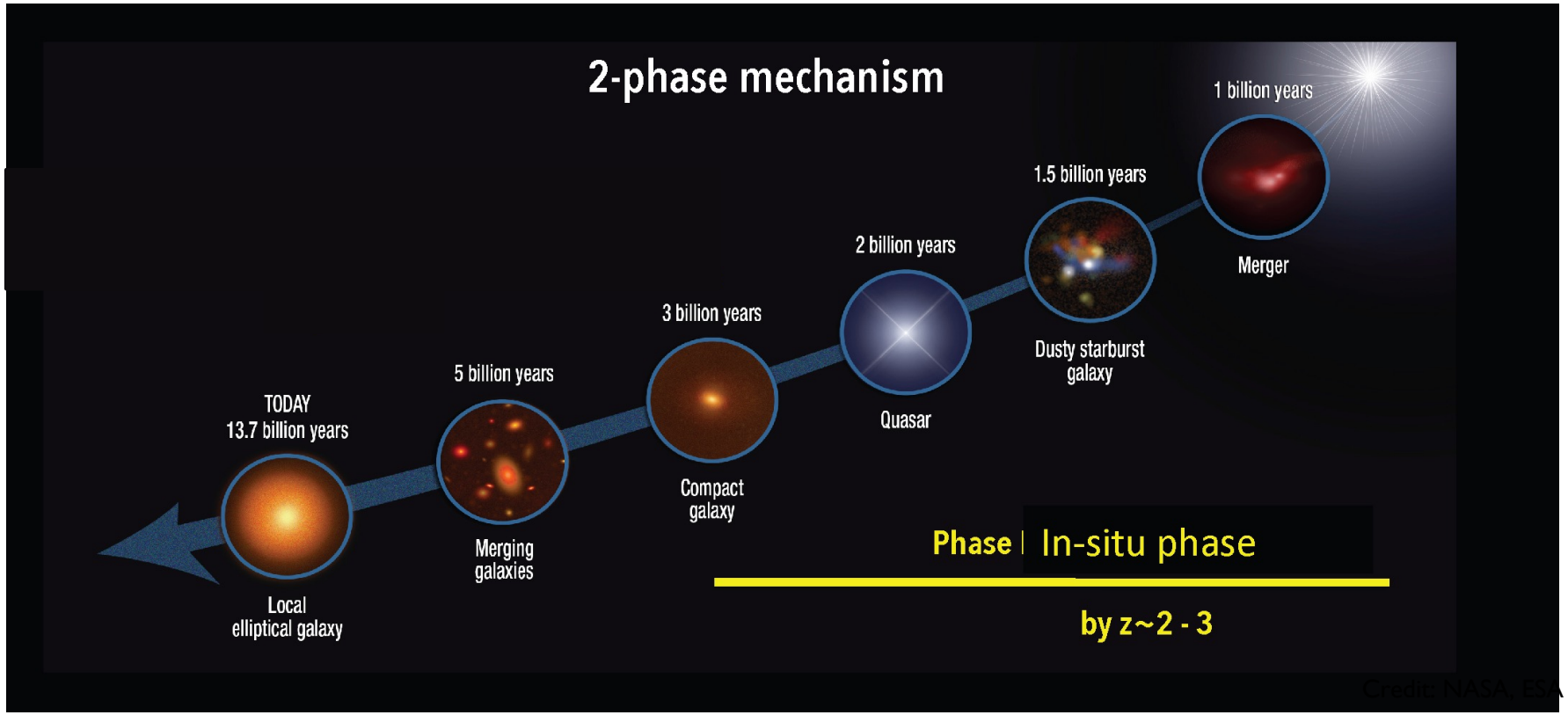


13 April 2021

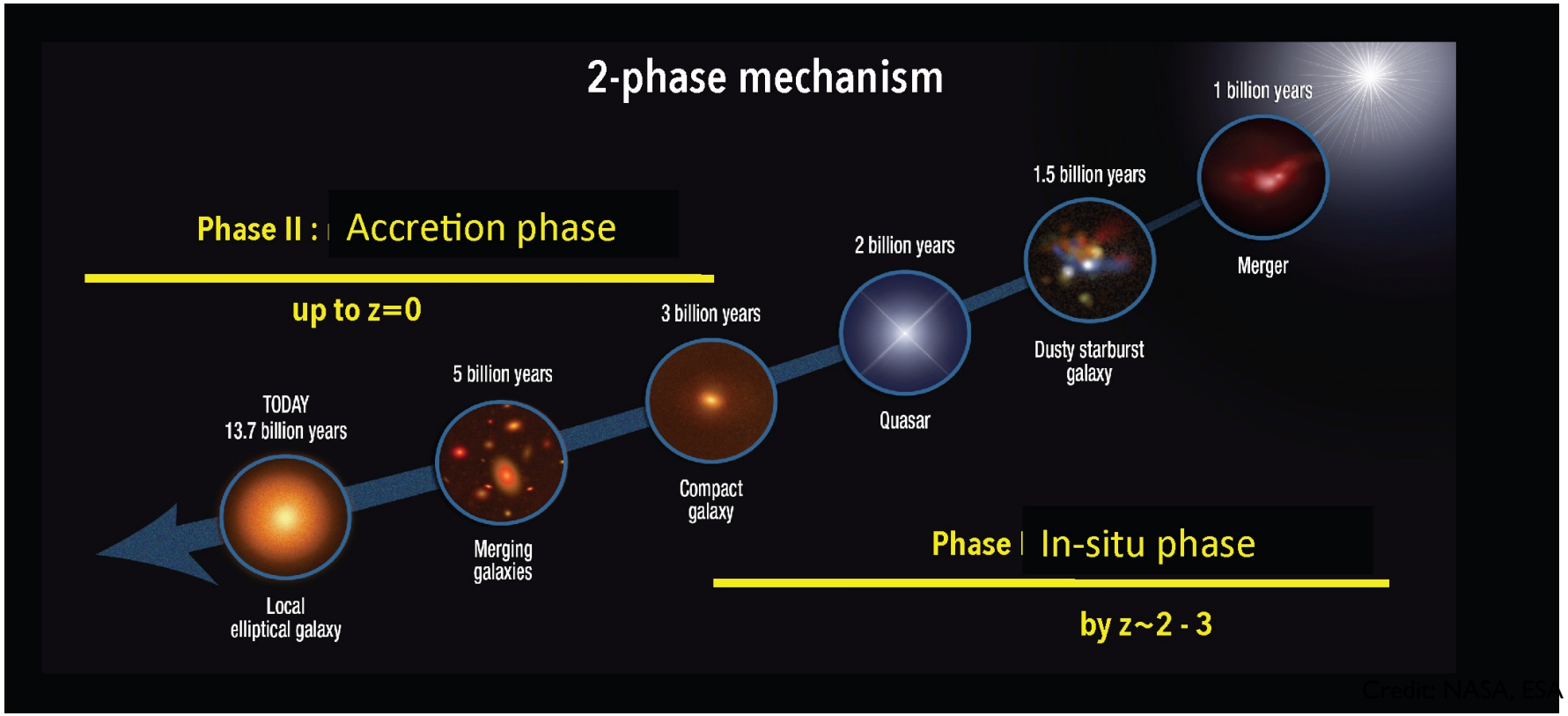
Internal mass distributions and orbital structures of SAMI passive galaxies

Giulia Santucci
University of New South Wales

TWO PHASE FORMATION SCENARIO



TWO PHASE FORMATION SCENARIO



SCHWARZSCHILD ORBIT-SUPERPOSITION MODELS

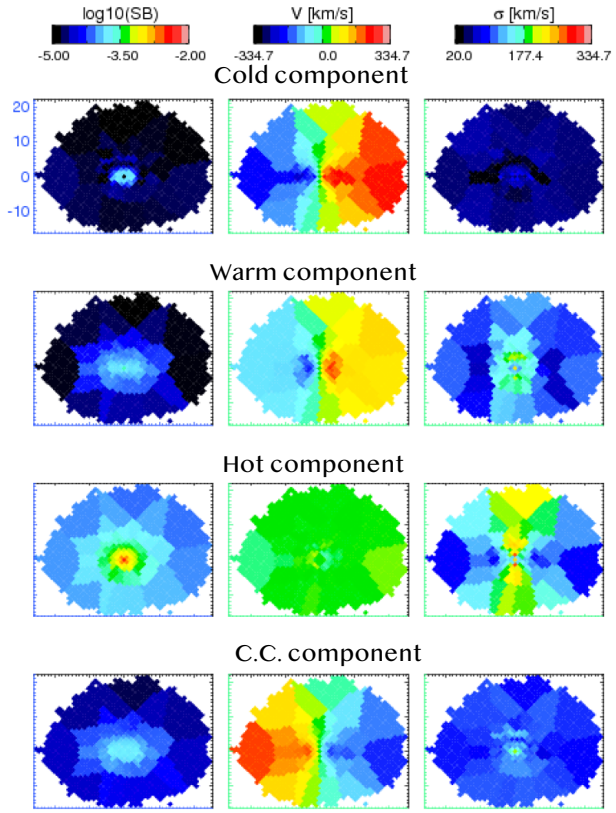
Schwarzschild's orbit-superposition dynamical modelling method.

Collaboration with **L. Zhu** and **G. van de Ven** - previously successfully applied to **CALIFA** galaxies (Zhu+18a,b,c) and to **MaNGA** galaxies (Jin+20)

Applied to SAMI passive galaxies.

What do we add to previous studies:

- A statistically significant number of galaxies in a range of stellar masses and environments.
- Information on the higher kinematic moments (h_3 and h_4, from van de Sande+17) – not available in previous studies.



NGC6020 – Orbital decomposition

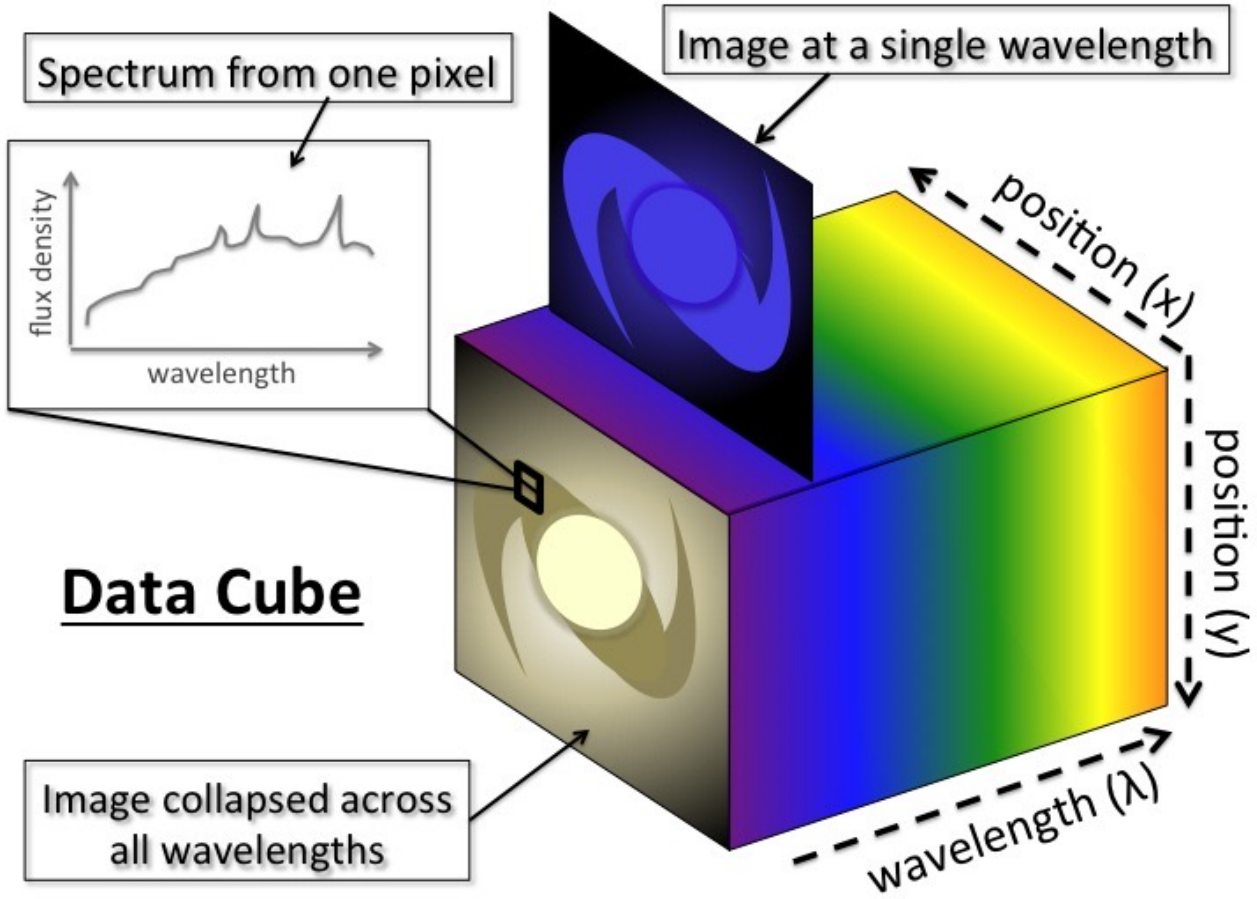
SAMI GALAXY SURVEY

Sydney-AAO Multi-object Integral field spectrograph (SAMI) Galaxy Survey is an optical Integral Field Spectroscopy survey of 3000 low redshift ($z<0.01$) galaxies.

124 passive galaxies

(primary sample)

$9.6 < \log M_*/M_\odot < 11.3$

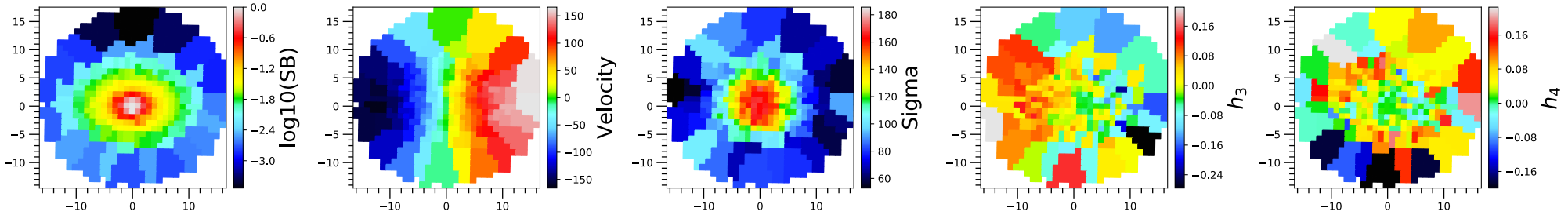


Credits: ASTRO3D

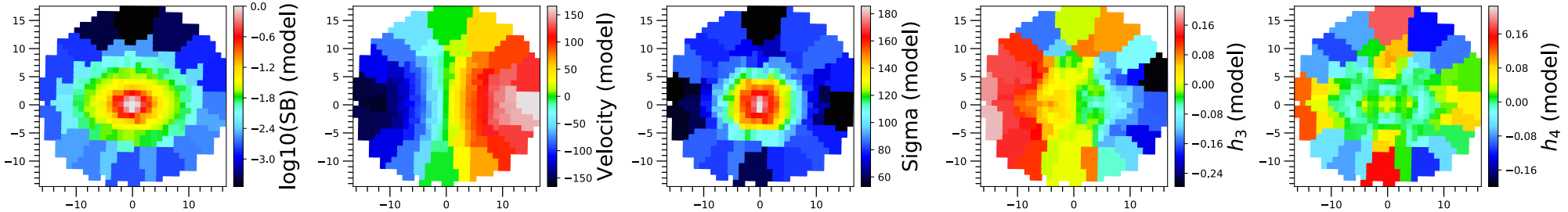
EXAMPLE GALAXY

GALAXY 323558

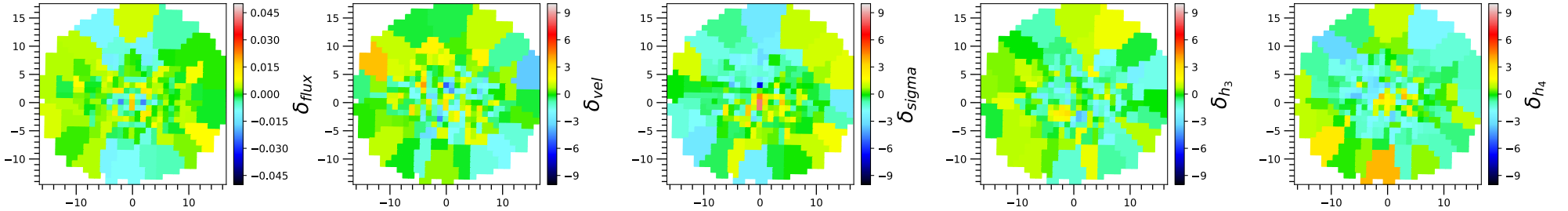
log M_* =10.9



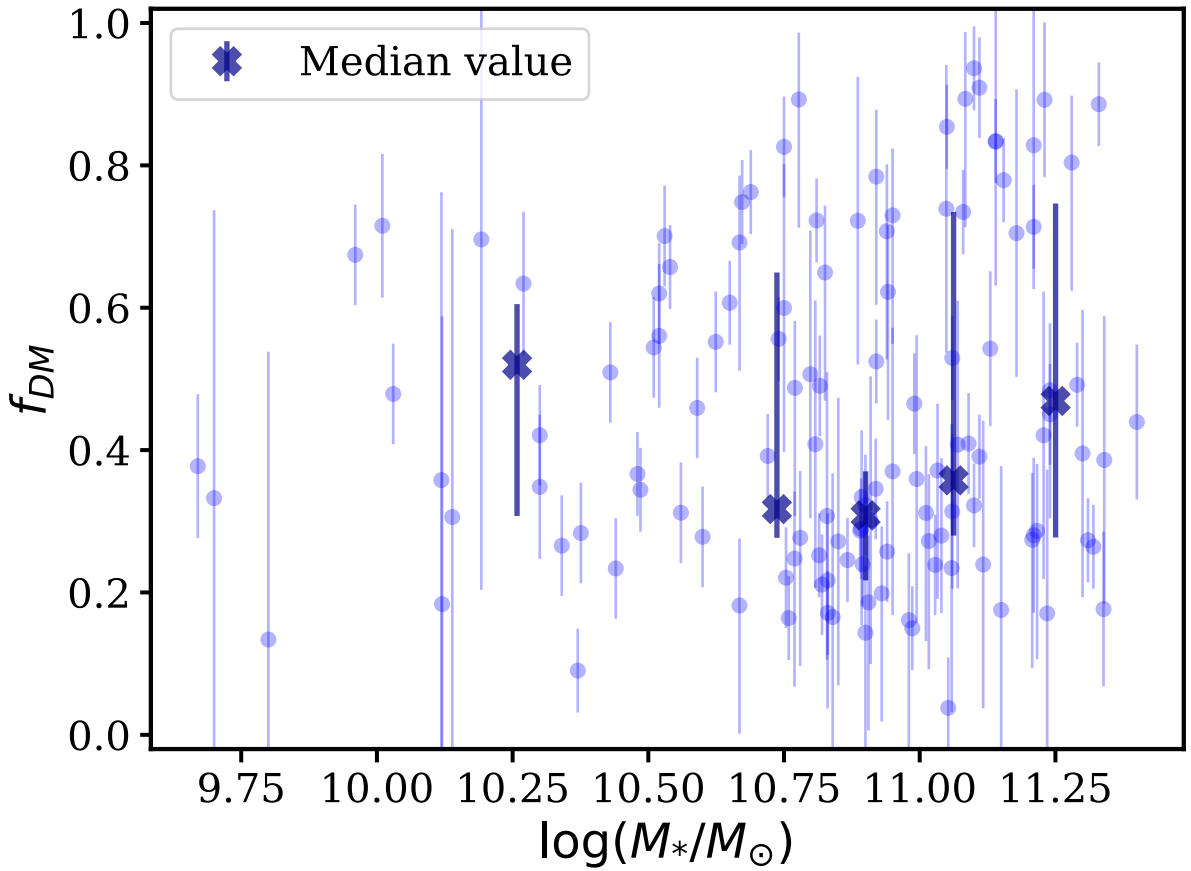
OBSERVED MAPS



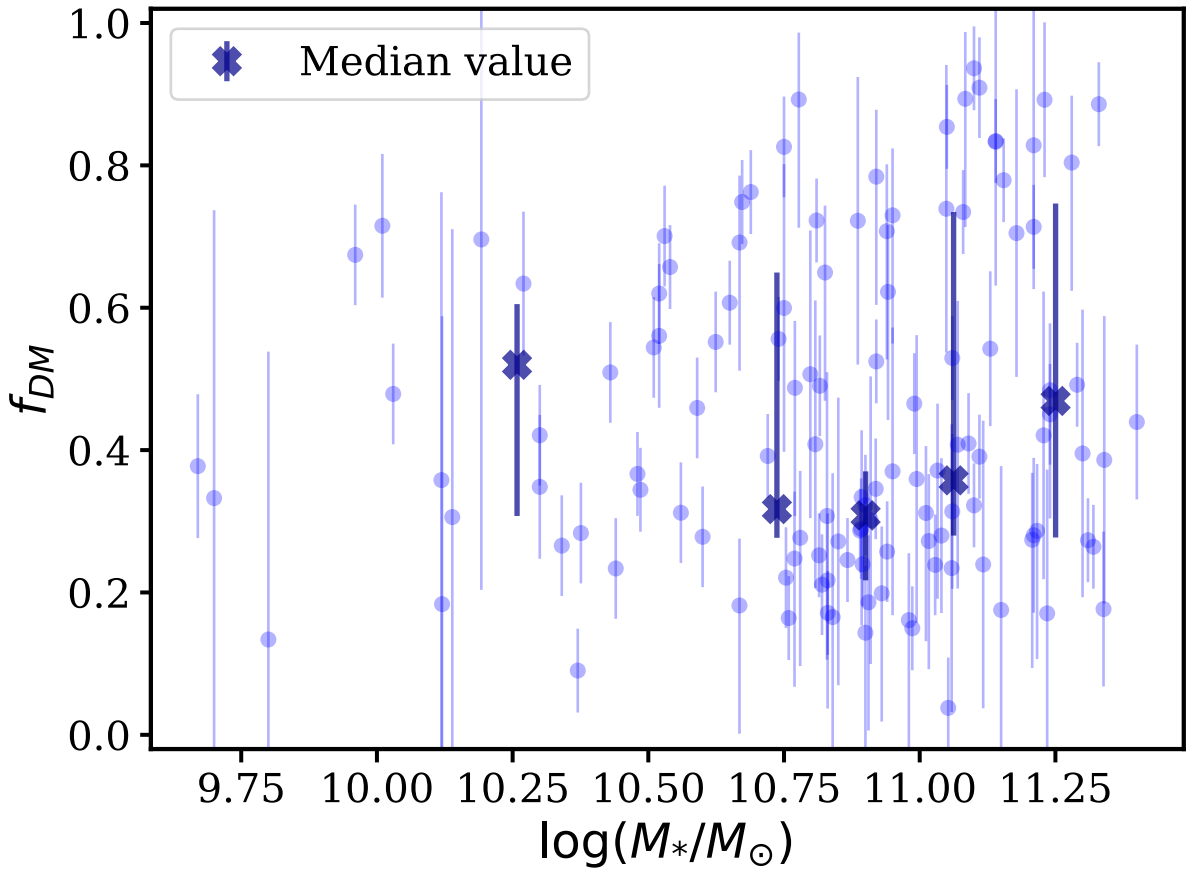
SCHWARZSCHILD MODEL MAPS

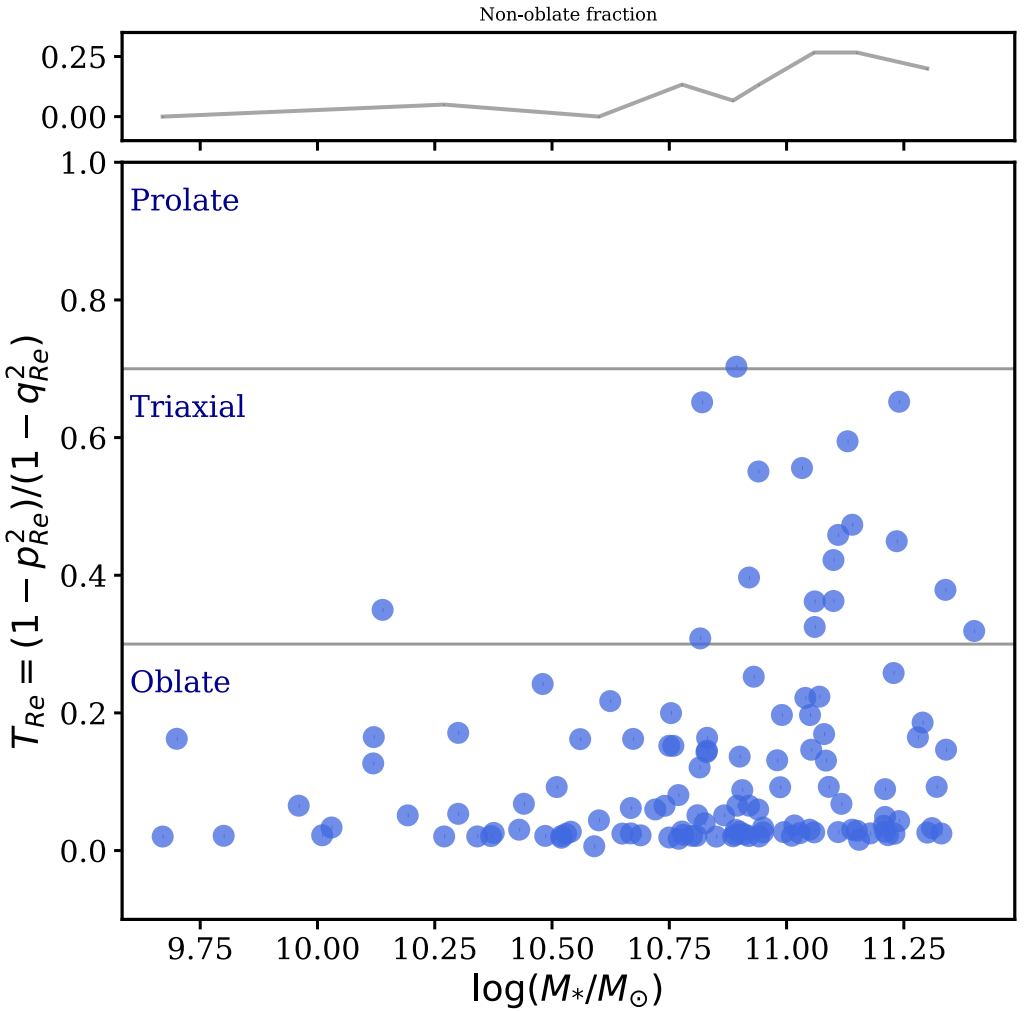


RESULTS – PRIMARY SAMPLE

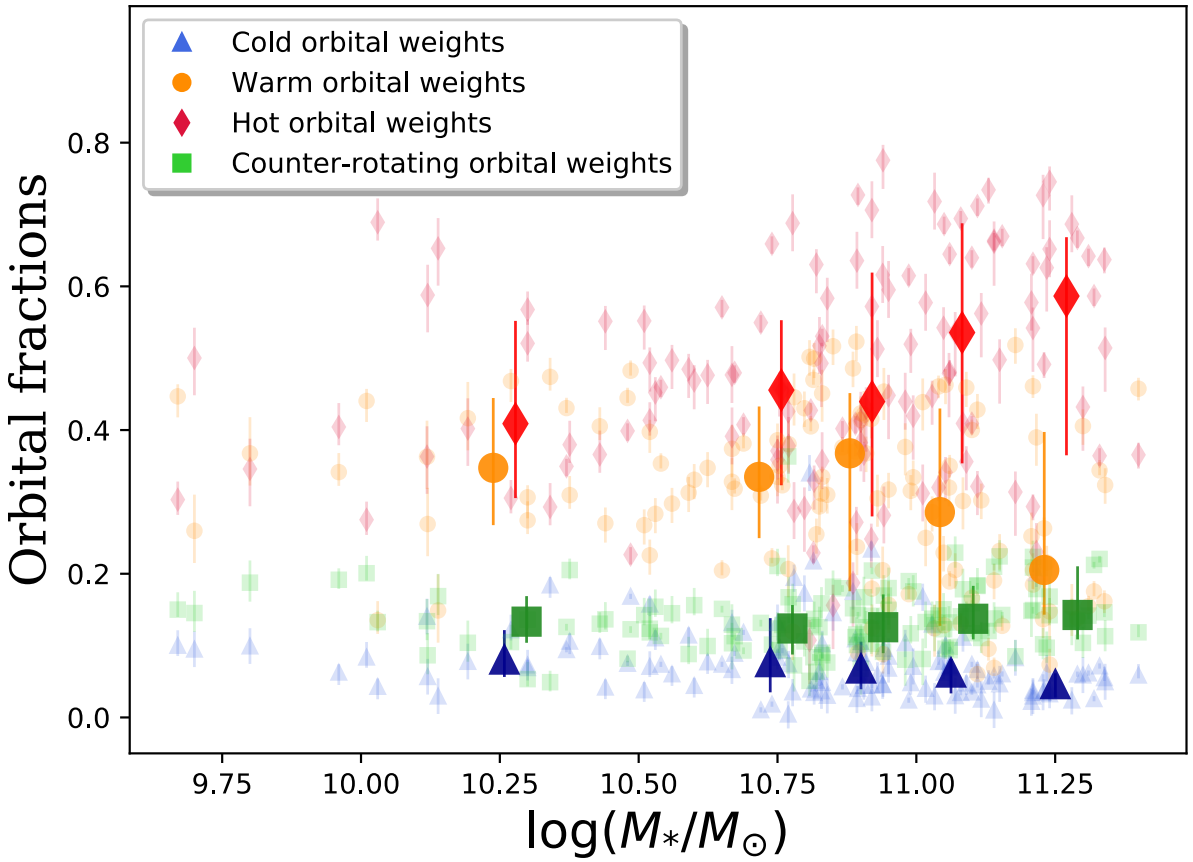


RESULTS – PRIMARY SAMPLE





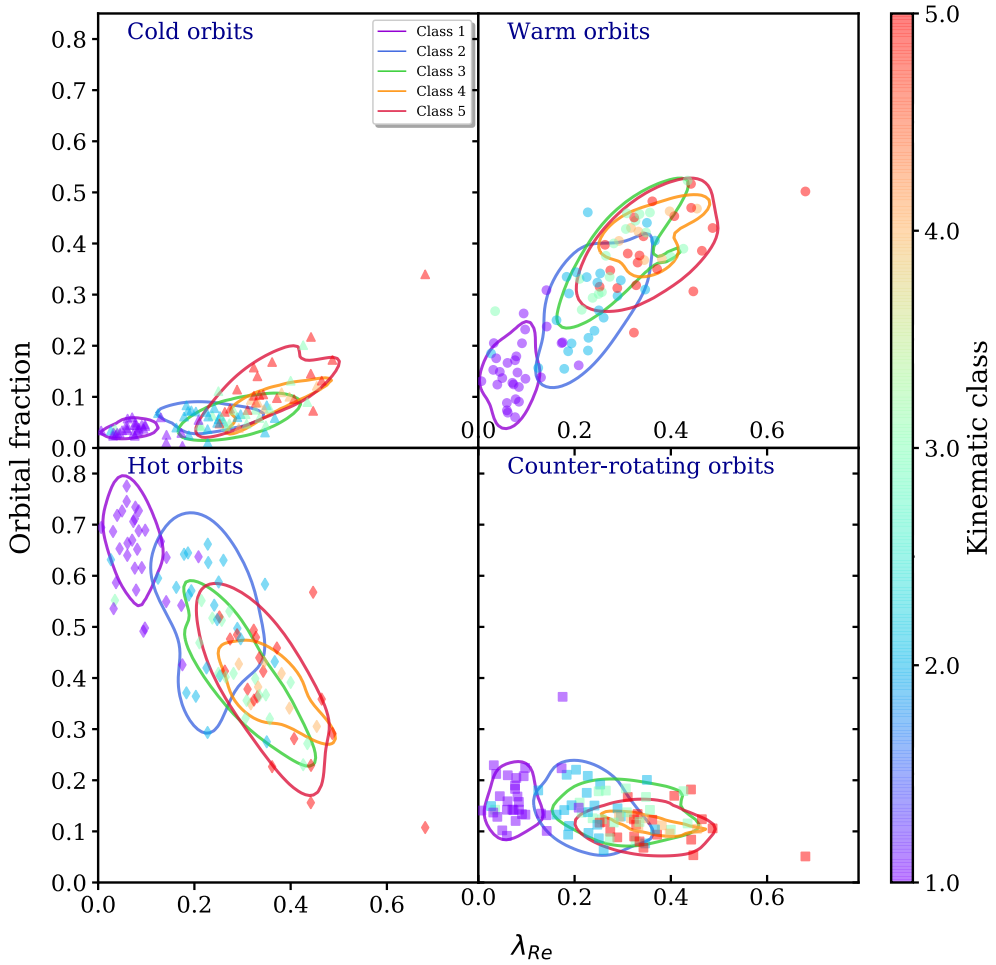
RESULTS – PRIMARY SAMPLE



Trends with stellar mass:

- Hot orbits: **increasing**
- Warm orbits: **decreasing**
- Cold orbits: slightly decreasing
- Counter-rotating orbits: slightly increasing

RESULTS – PRIMARY SAMPLE



Kinematic classes (van de Sande et al. 2017)

CLASS 1 – slow rotators, most massive, large and red. Mostly supported by hot orbits

CLASS 2 – Less massive than Class 1 but still red. In between slow and fast rotators. Warm component becomes important.

CLASS 3 and CLASS 4 – real fast rotators. Regular rotators. Anti-correlation between V/σ and h3

CLASS 5 – Fast rotators, no anticorrelation. Show signs of disturbance in their kinematics.

SUMMARY

We used Schwarzschild models to derive the intrinsic properties of local galaxies. First time used for galaxy in the SAMI Galaxy Survey:

- The most massive galaxies more likely to be triaxial, compared to galaxies of lower mass.
- Massive galaxies are mostly pressure-supported, with a high fraction of hot orbits. For galaxies of lower stellar masses, warm orbits play a significant role.
- The higher order moments can help us understand the internal structure of galaxies when modelling is not possible.


THANK YOU!
... QUESTIONS?