Angular Momentum Content of Late-Type WHISP Galaxies

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The HI/Story of the Nearby Universe

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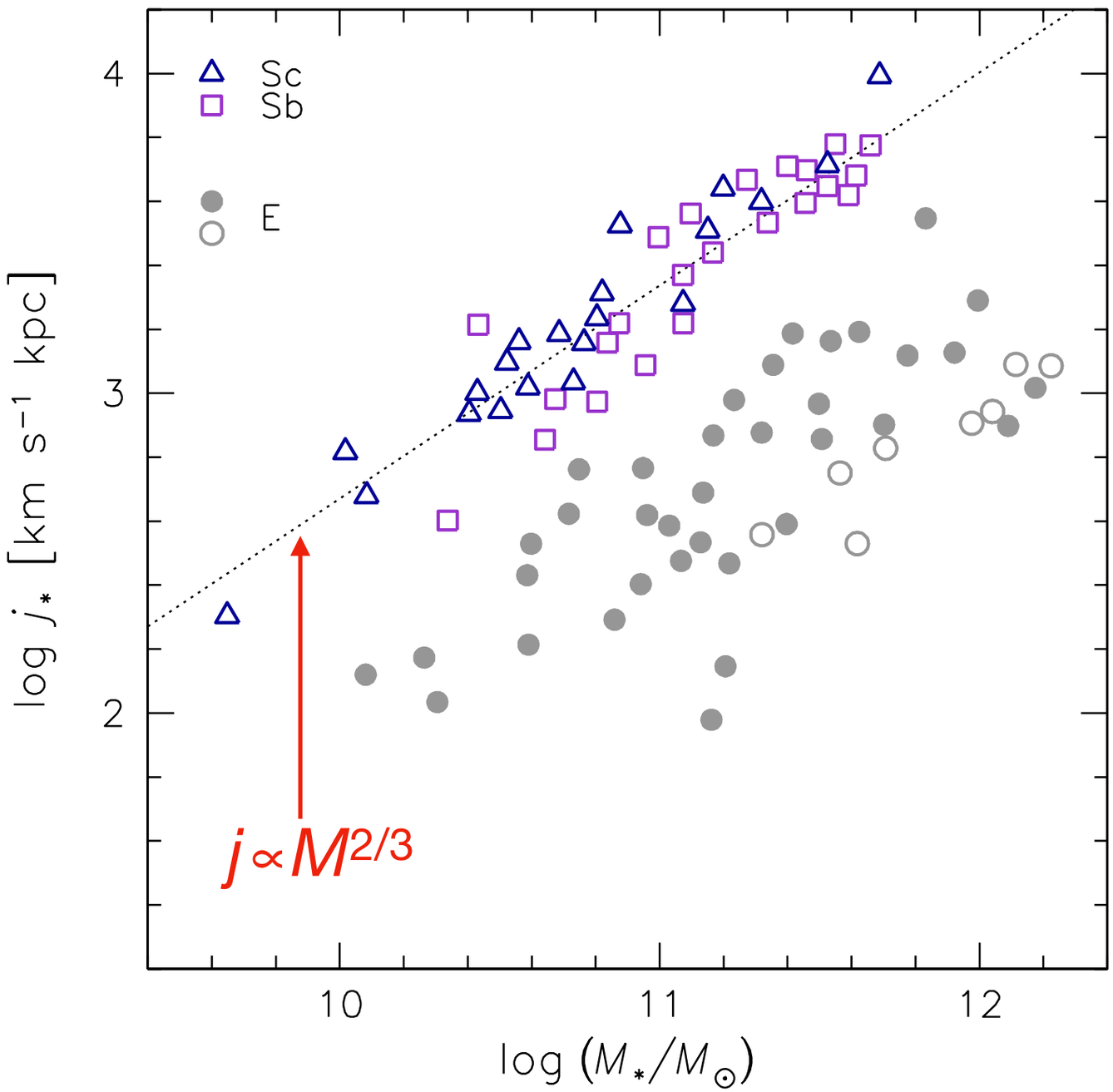
Introduction

- A galaxy's observable properties are intimately linked to its angular momentum (AM) content.

- Specific AM ($j \equiv J/M$) is tightly related to mass: $j \propto M^{2/3}$.

- Ellipticals contain 3-7 times less AM than spirals of equal mass.

Figure: Fall (1983)



Introduction

- Over the past few years, high-precision measurements of *j*:

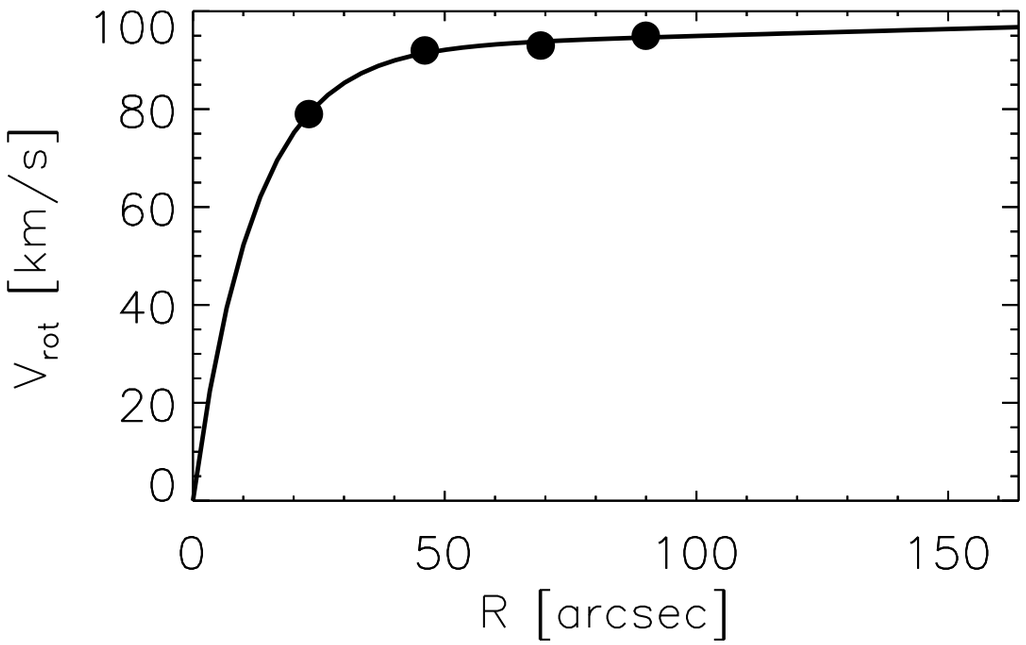
$$j = \frac{\int_r \boldsymbol{r} \times \boldsymbol{v} \cdot \rho \cdot d^3\boldsymbol{r}}{\int_r \rho \cdot d^3\boldsymbol{r}}$$

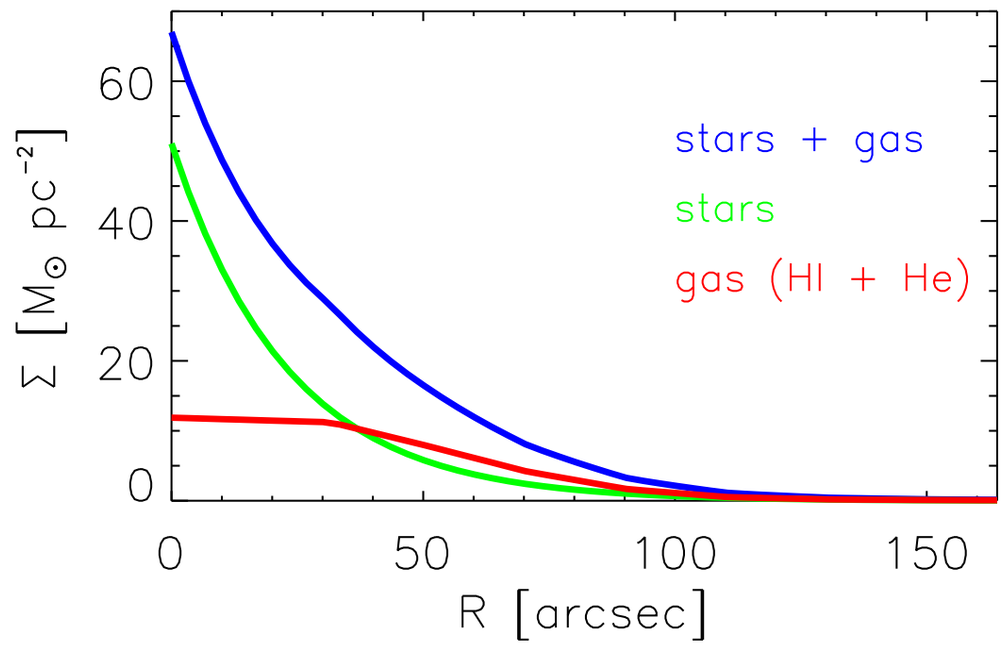
- Obreschkow & Glazebrook (2014): 3D relationship between j_b, M_b and β for 16 THINGS spirals.

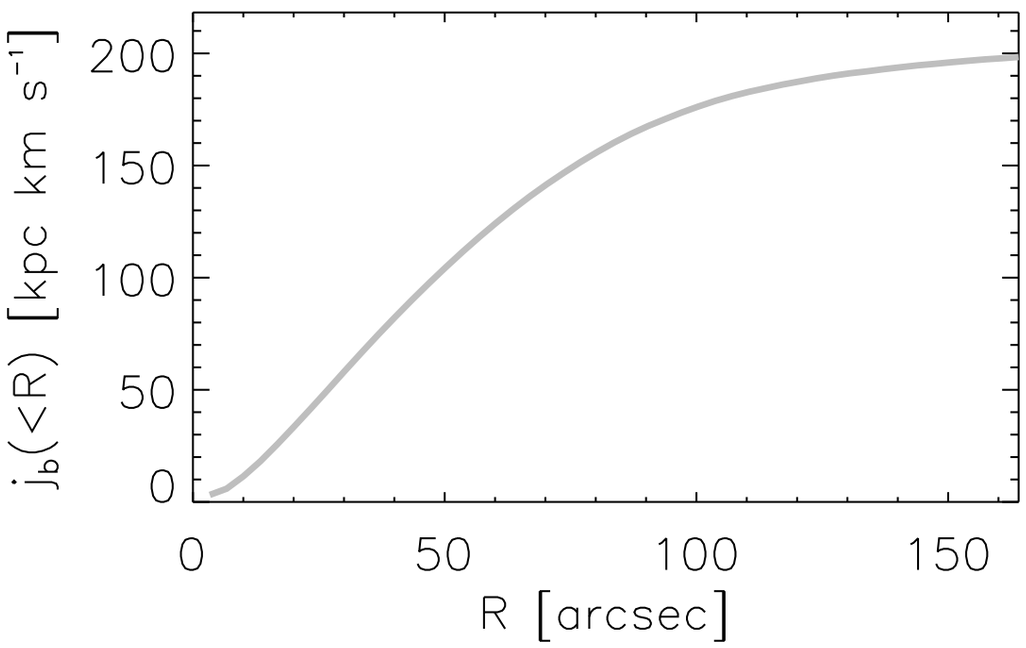
WHISP Study

- In Elson (2017):
  - Used WHISP imaging of 37 late-type galaxies to probe low-mass end of **baryonic** *j-M* relation.
  - Rotation curves taken from Swaters et al. (2009).
  - $\Sigma_{star}(r)$ profiles generated from *R*-band parameters given in Swaters et al. (2009).
  - New $\Sigma_{HI}(r)$ profiles generated.

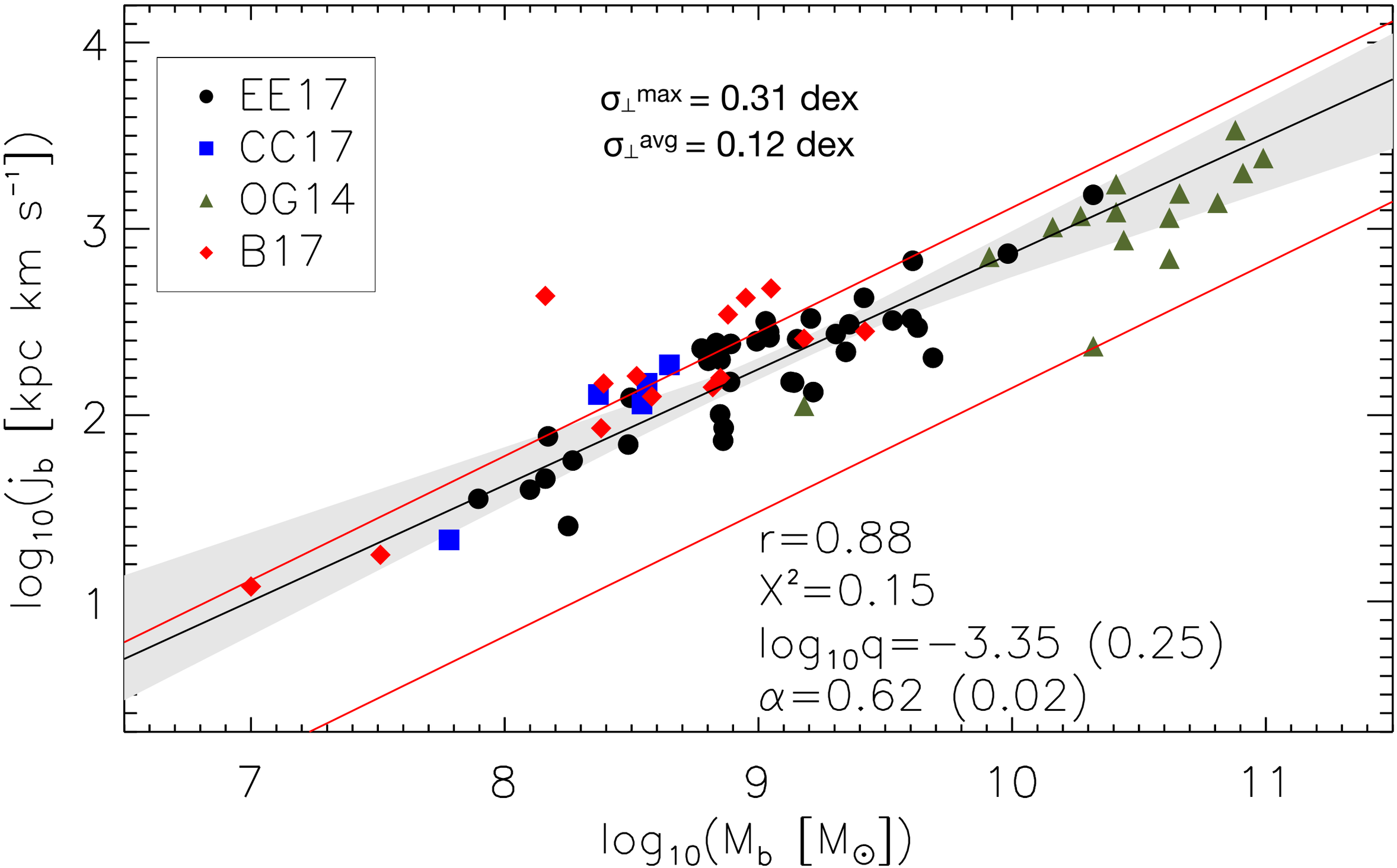
Example profiles - UGC 3711







Main Result


EE17
CC17
OG14
B17
$\sigma_\perp^{max}$ = 0.31 dex
$\sigma_\perp^{avg}$ = 0.12 dex
r=0.88
X^2=0.15
$\log_{10}q$=−3.35 (0.25)
α=0.62 (0.02)
$\log_{10}(j_b$ [kpc km s^{-1}]$)$
$\log_{10}(M_b$ [$M_\odot$])
1
2
3
4
7
8
9
10
11

Thank you

- See Elson (2017) for full details. arXiv:1709.03288

- See Unarine Tshiwawa's talk on Wednesday for a j_b-M_b study using WHISP early-type galaxies.

- Questions?