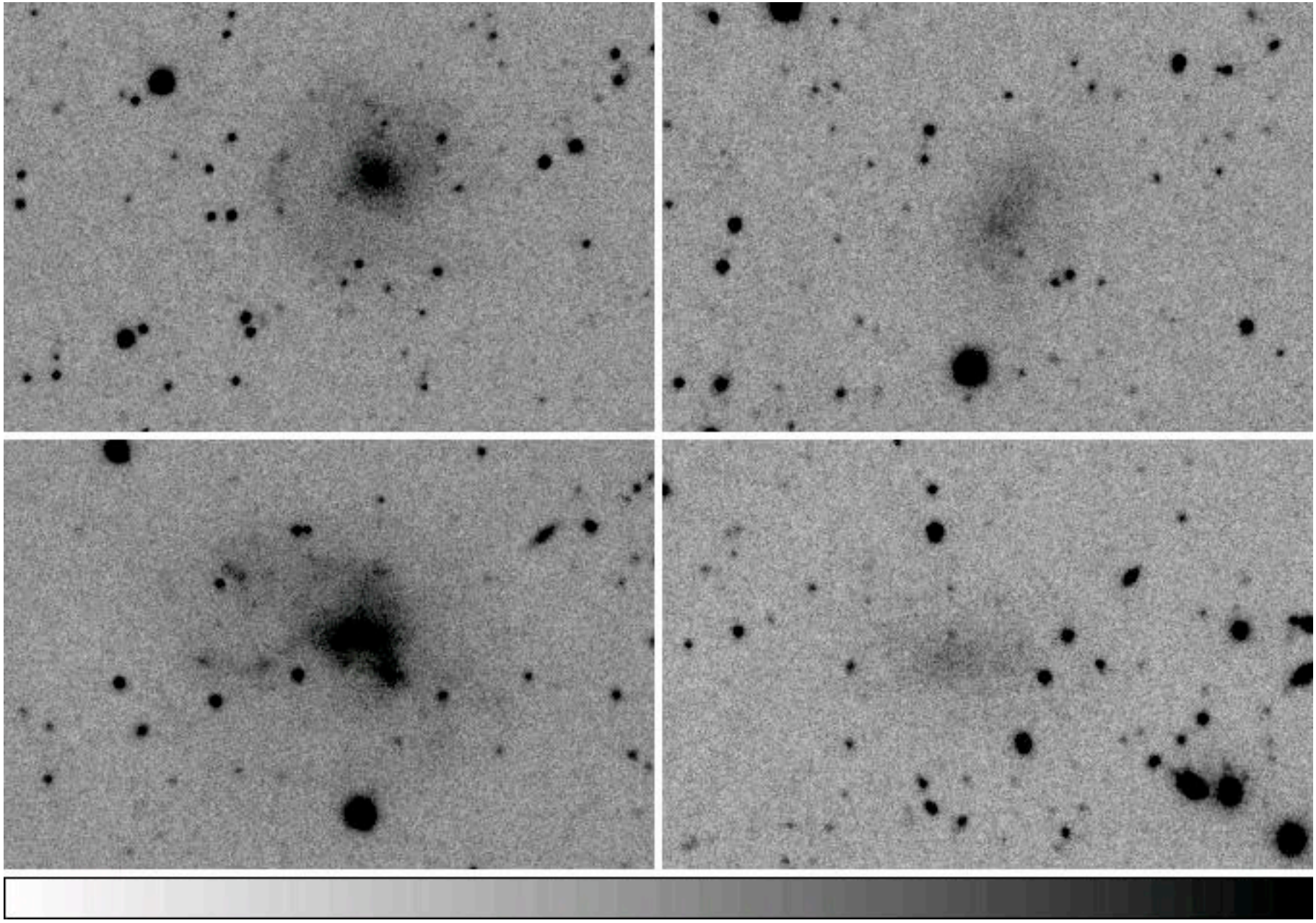
Low surface brightness/dwarf Irregular galaxies



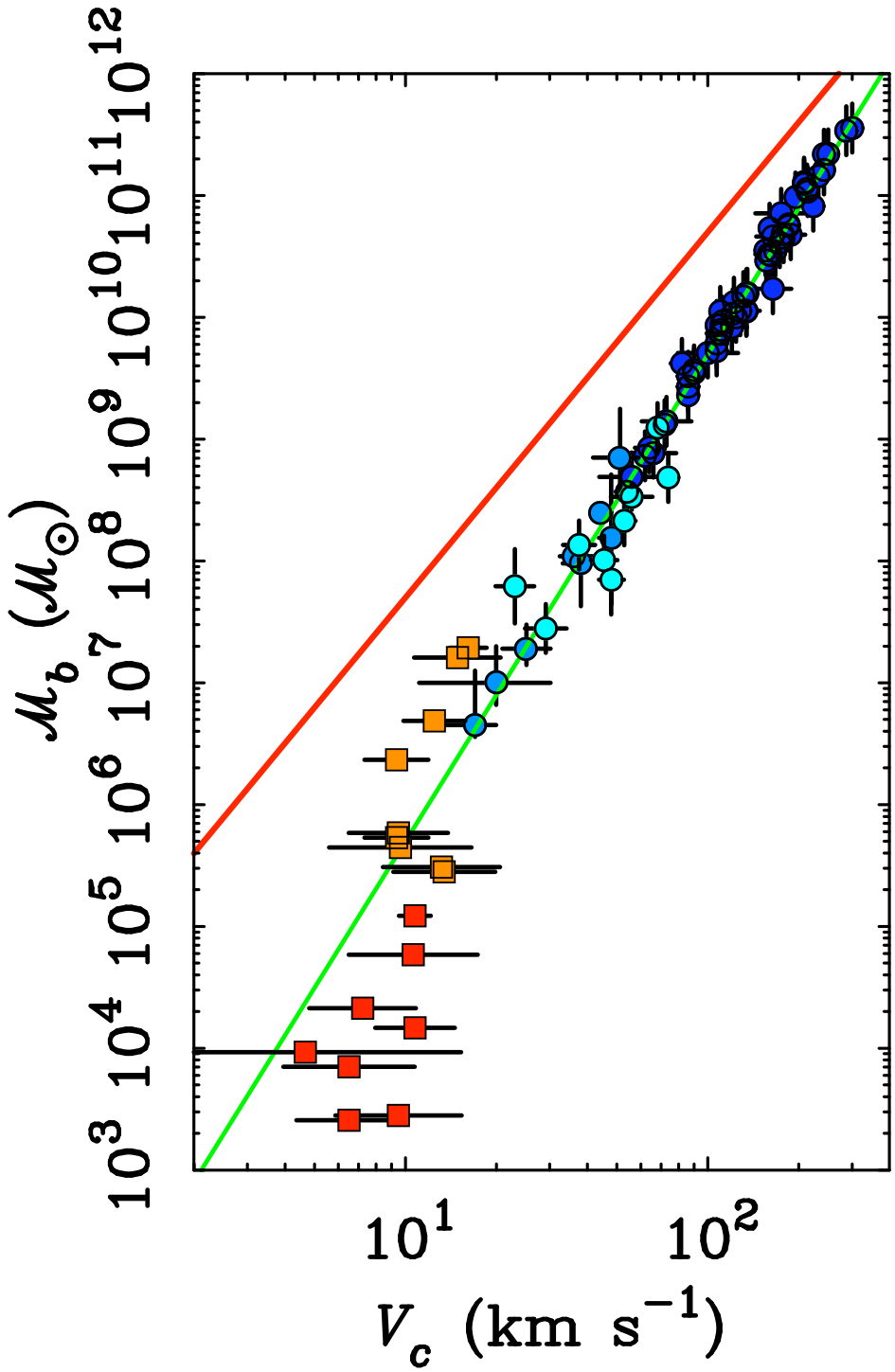
Rotationally supported, gas rich

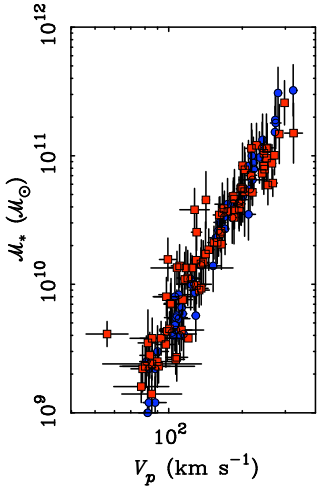
No indication of a sharp transition due to reionization

Assumes

$$\Upsilon_\star = 1$$

$$V_c = \sqrt{2}\sigma$$

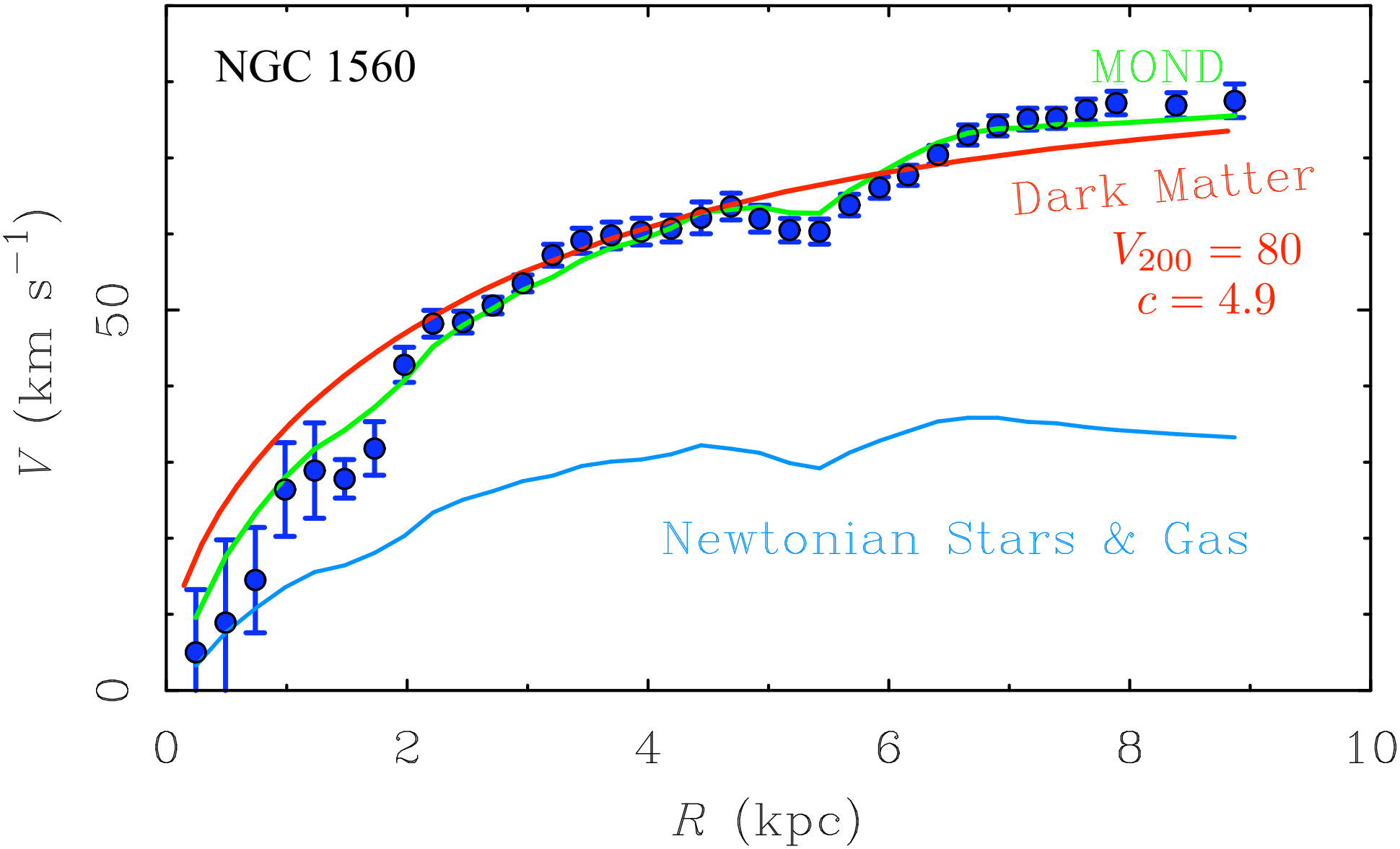




Mateo (1998)

Simon & Geha (2007)

cusp/core problem

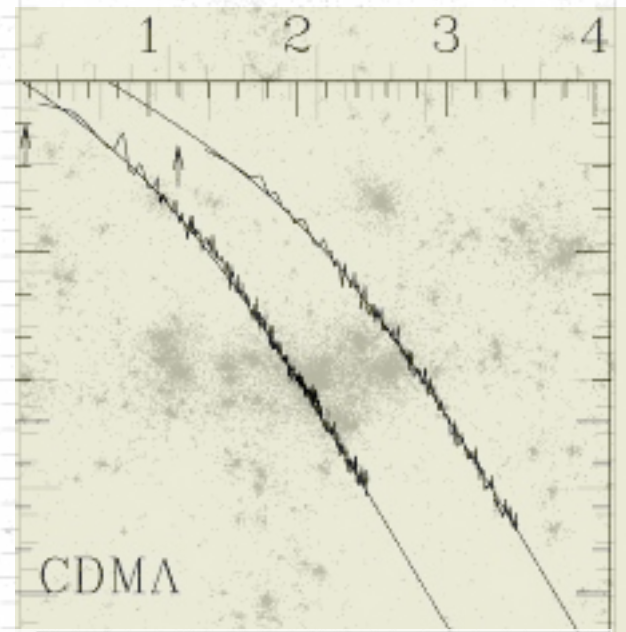


CUSP-CORE PROBLEM

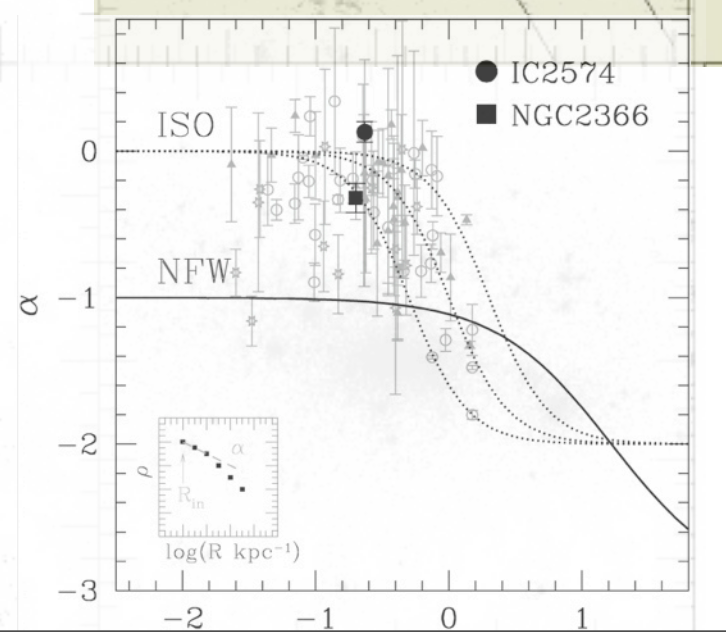
$$\rho(r) = \frac{\delta_c \rho_c}{(r/r_s)(1 + r/r_s)^2}$$

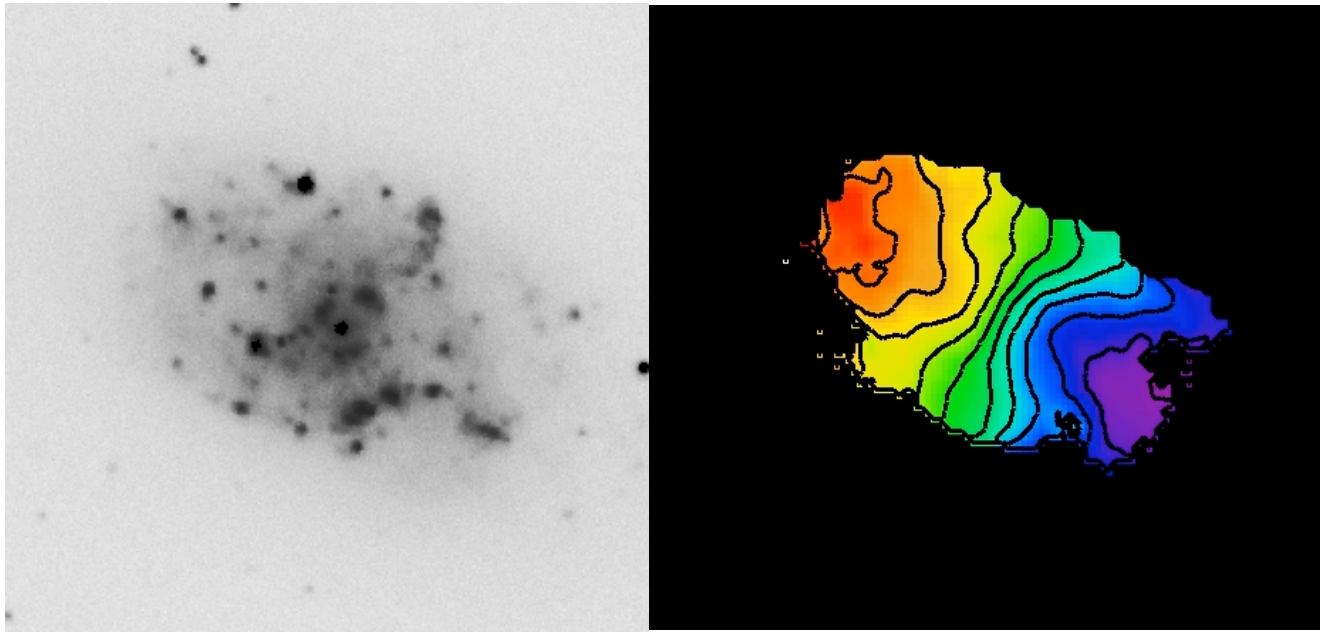
$$V^2(r) = V_{200}^2 \frac{\ln(1 + cx) - cx/(1 + cx)}{\ln(1 + c) - c/(1 + c)}$$

$$x = r/r_{200} \qquad c = r_{200}/r_s$$

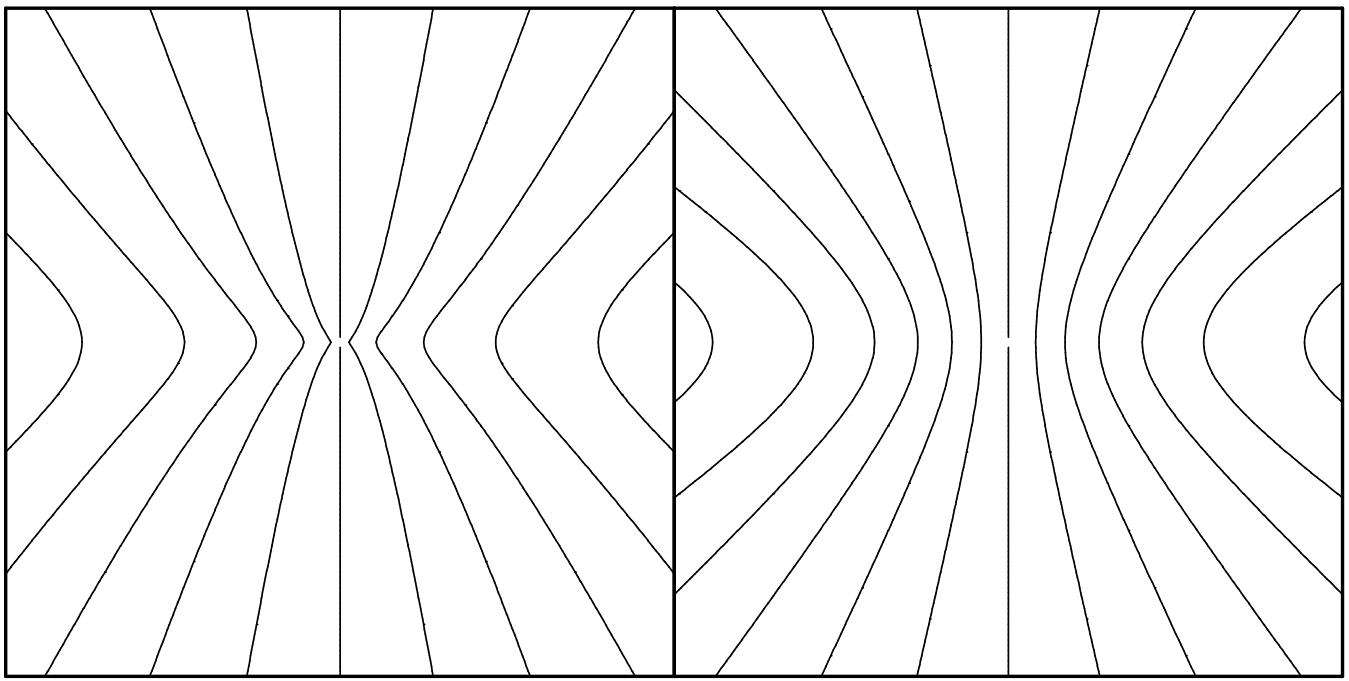


Rachel Kuzio de Naray

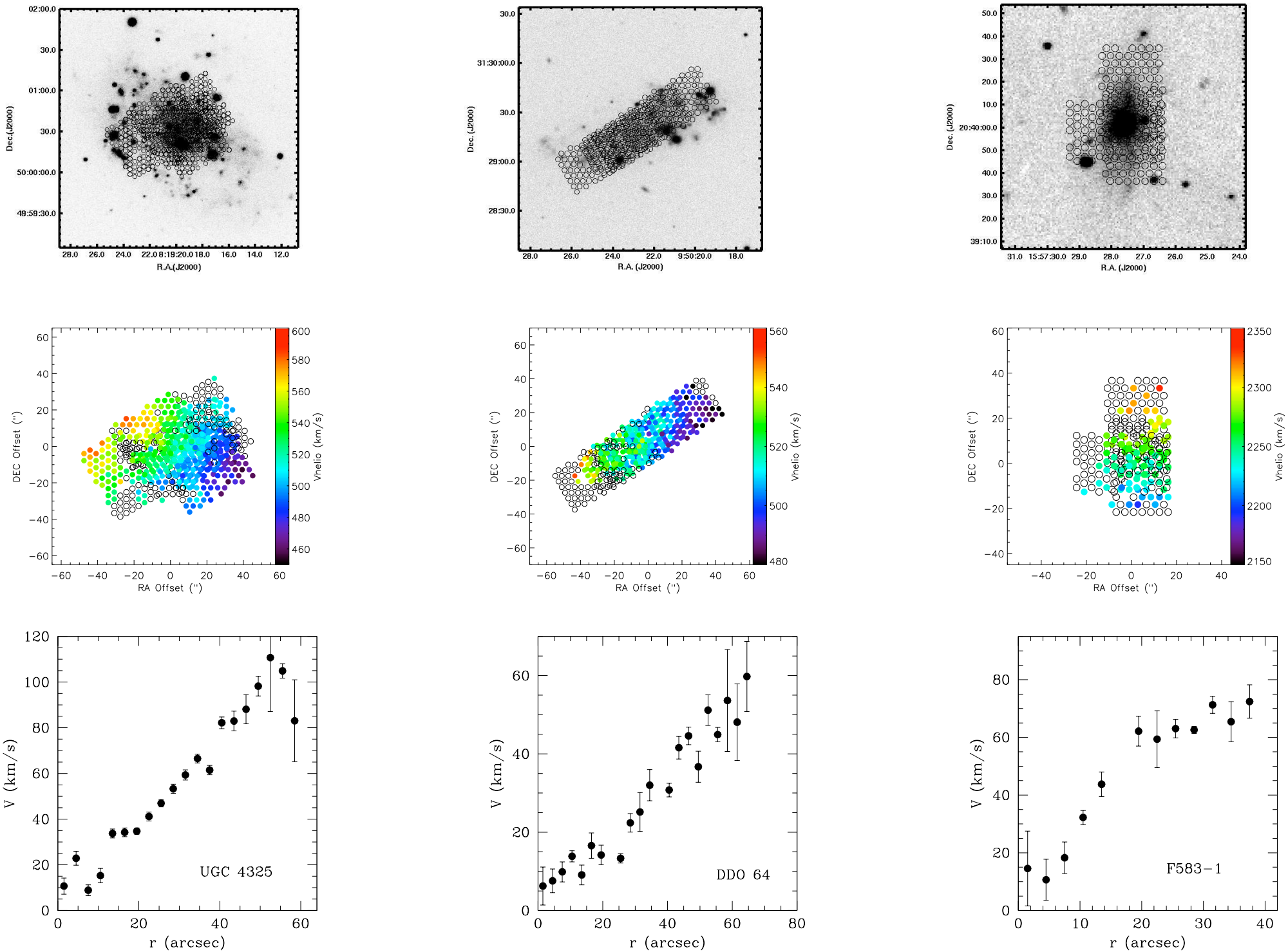


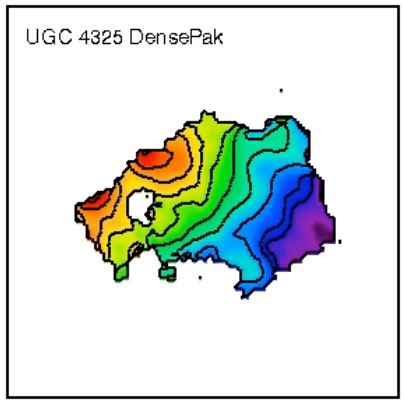


NFW



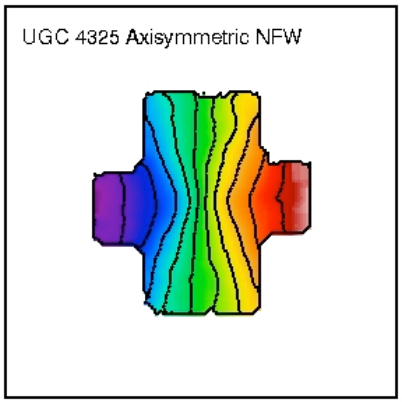
solid body

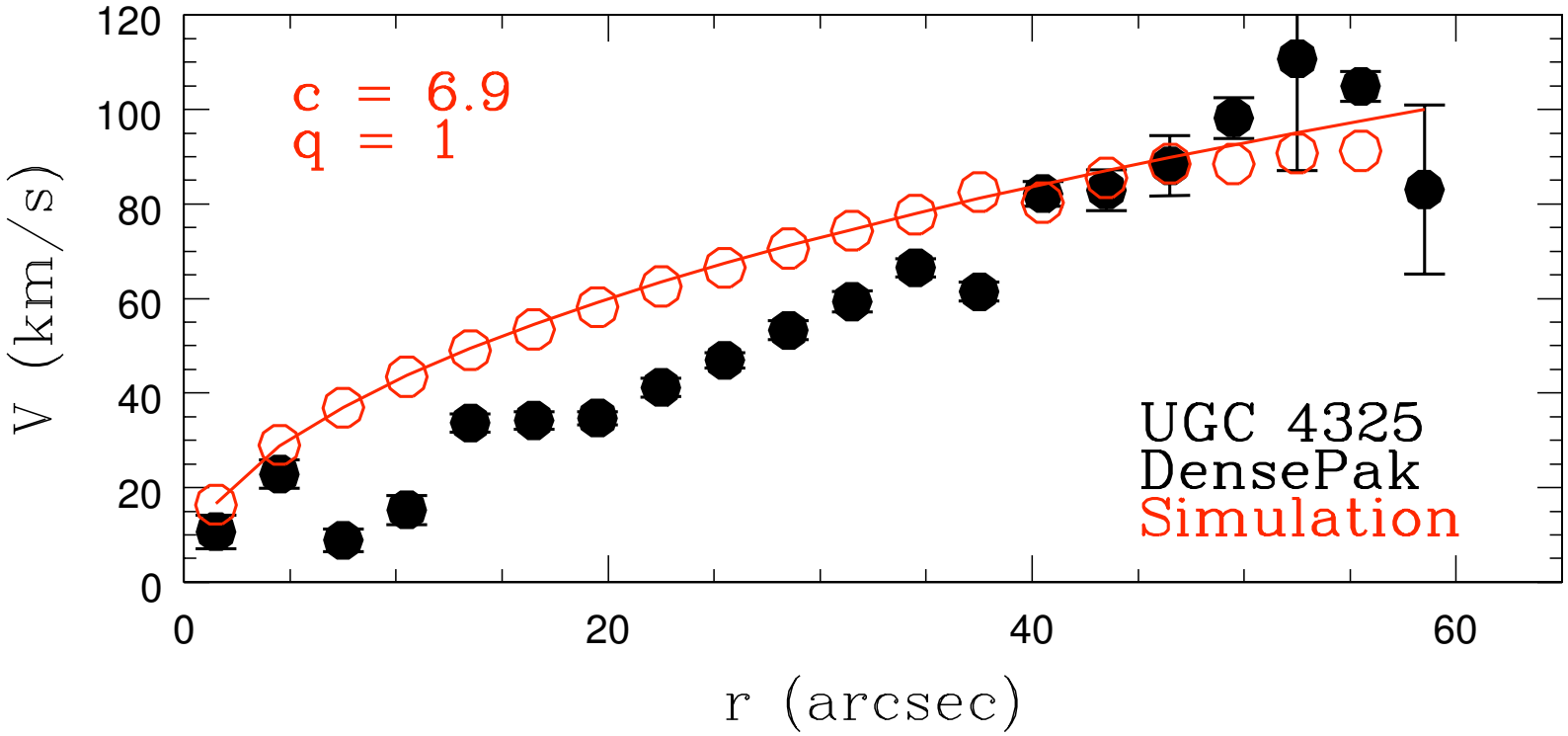

Dec.(J2000)
R.A.(J2000)
Dec. (J2000)
R.A. (J2000)
DEC Offset (")
RA Offset (")
Vhelio (km/s)
V (km/s)
r (arcsec)
UGC 4325
DDO 64
F583−1



data

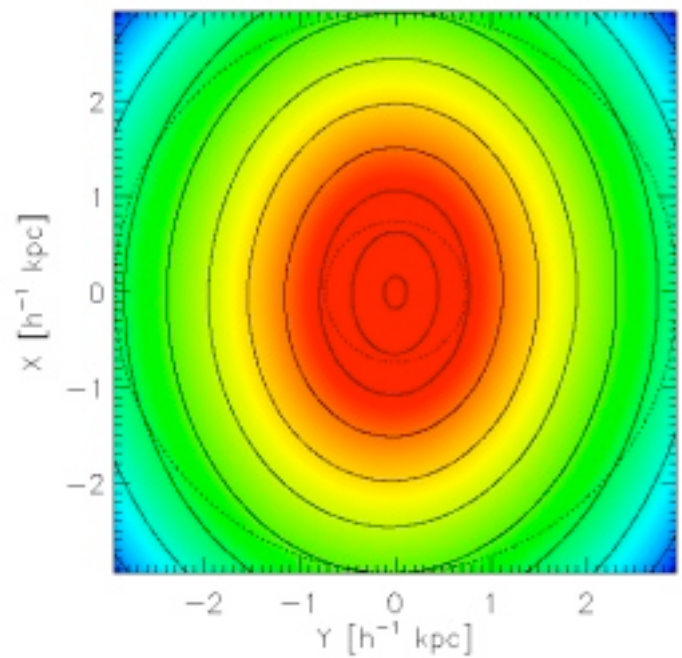
simulation



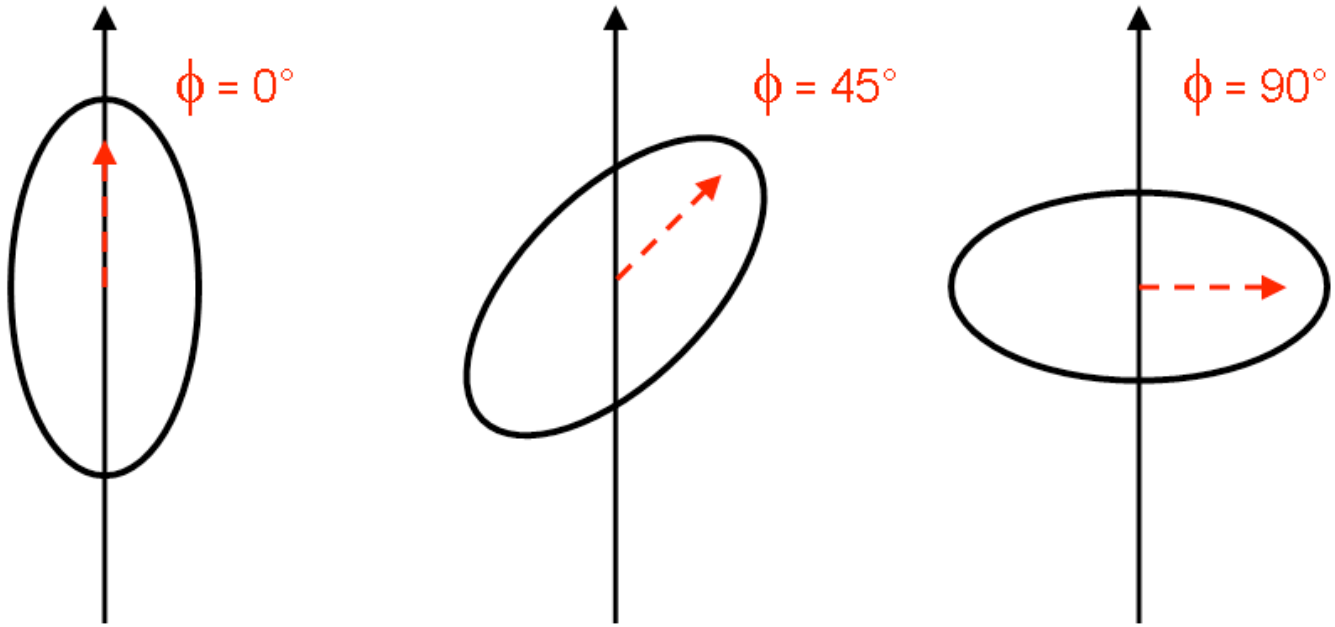


cusps would be easily detected if present

What if halos are not spherical?

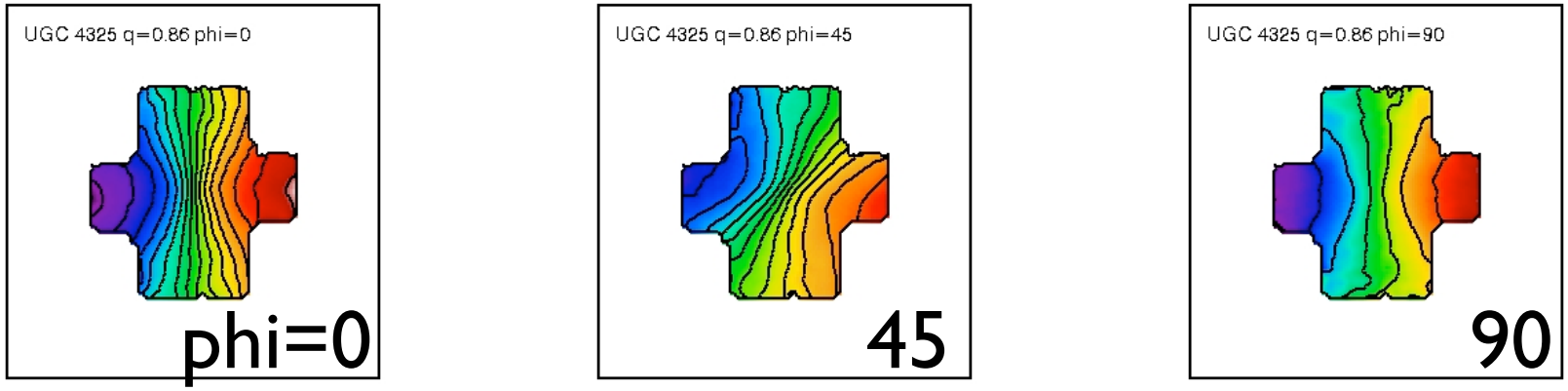


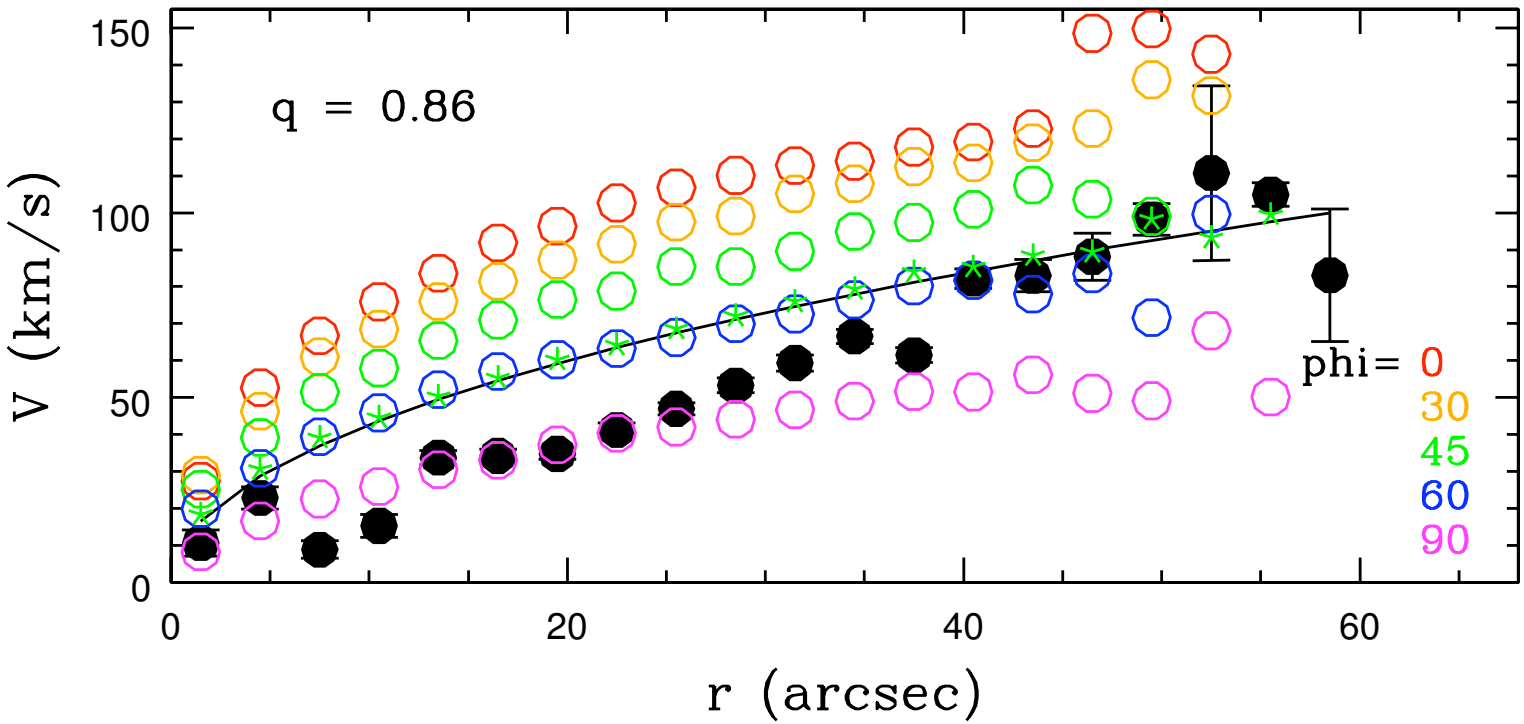
Hayashi, Navarro, & Springel



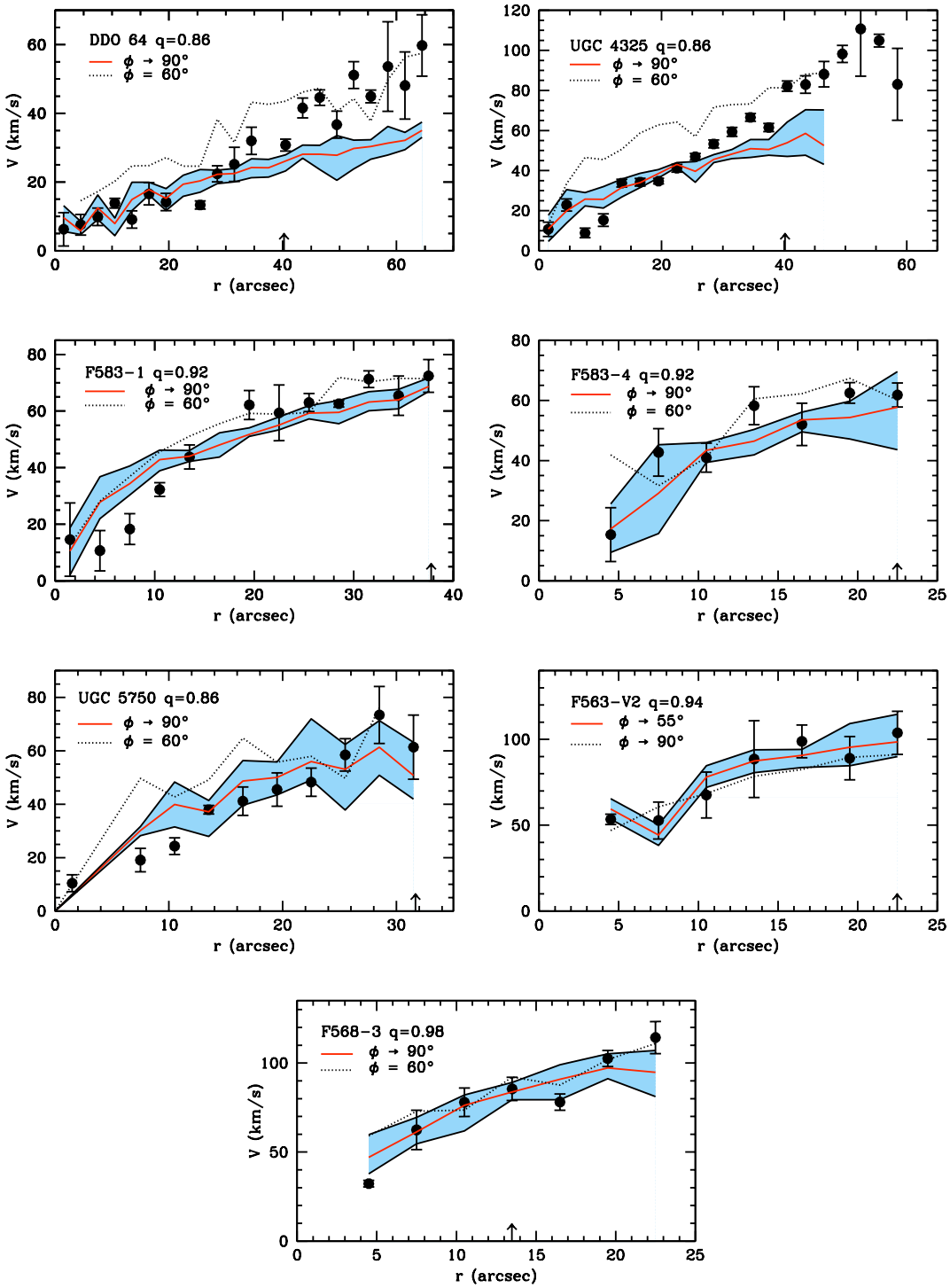
$$\Phi(R) = -\frac{GM_{200}\ln(1+R/R_s)}{R[\ln(1+c)-c/(1+c)]}$$

$$R = \sqrt{x^2 + (y/q)^2}$$



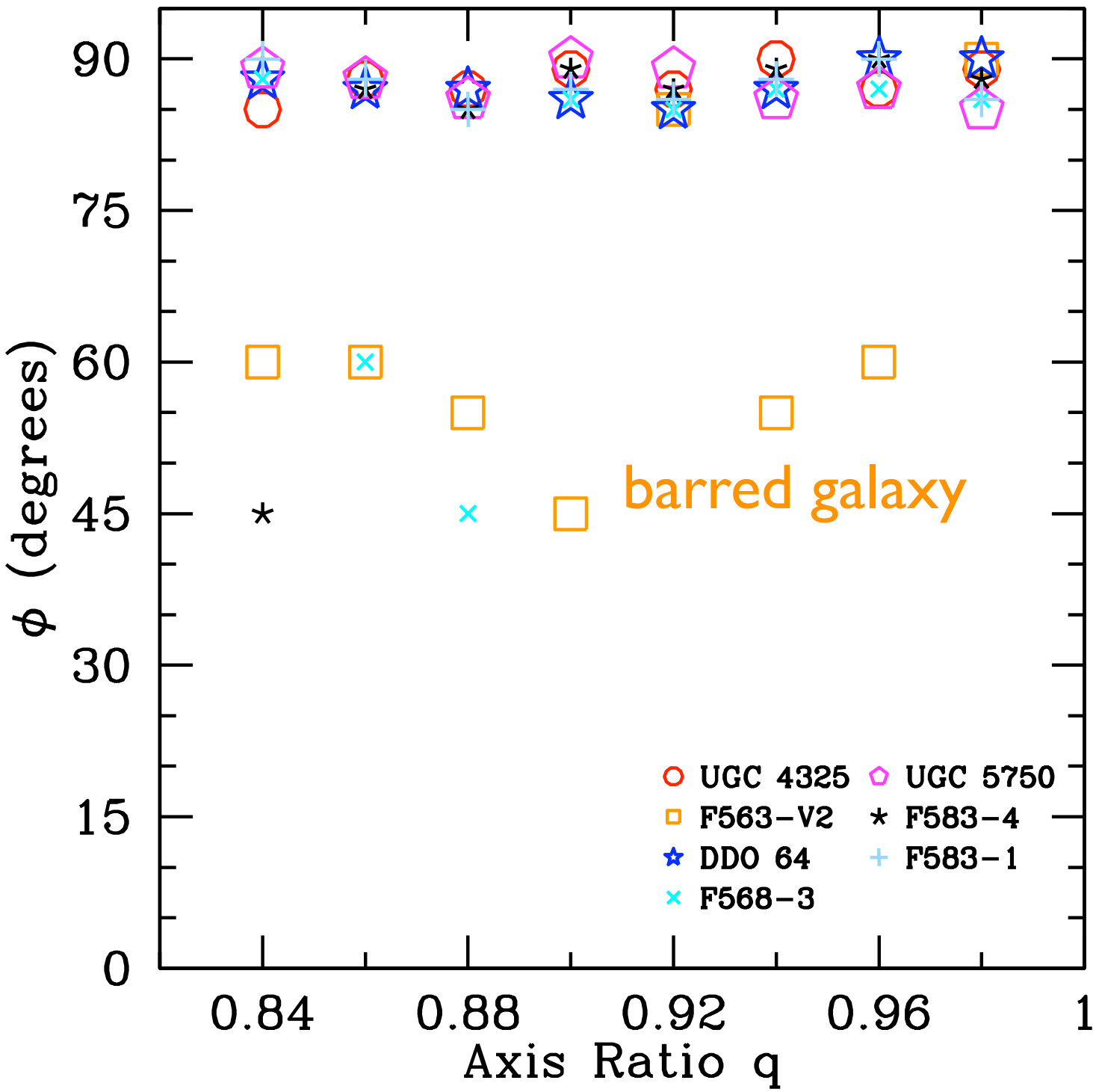


Squashed halos can both enhance and suppress the observed velocity wrt the true circular velocity



A 2 zone q(r) sort of works: prolate at small R; spherical at large R

but...


90
75
60
45
30
15
0
φ (degrees)
0.84
0.88
0.92
0.96
1
Axis Ratio q
barred galaxy
UGC 4325
UGC 5750
F563−V2
F583−4
DDO 64
F583−1
F568−3

CUSP-CORE PROBLEM

- still with us
- cusps would be detected if present in all LSB galaxies and due to spherical halos
- triaxial halos appear to help, BUT require improbable halo orientations on sky