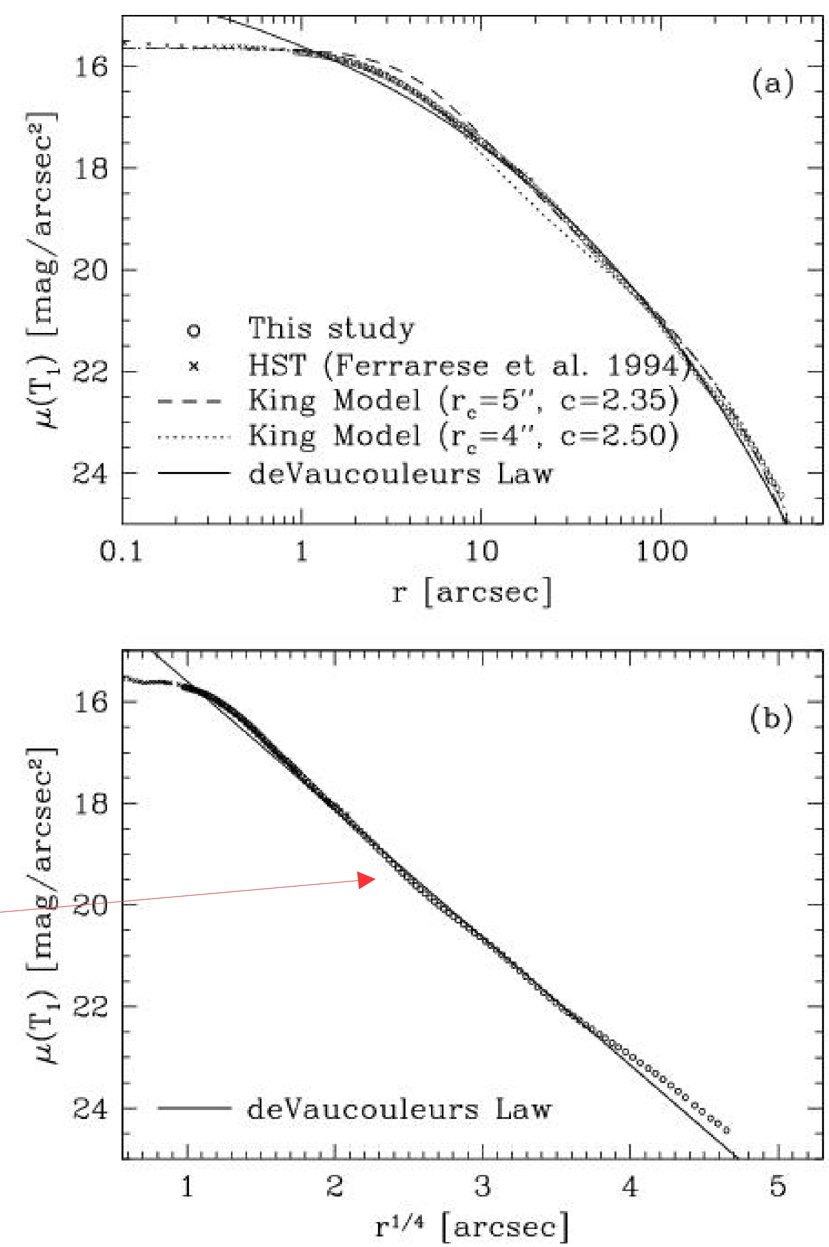
CCD surface photometry of the giant elliptical NGC 4472

de Vaucouleurs profile
or
r^1/4 law



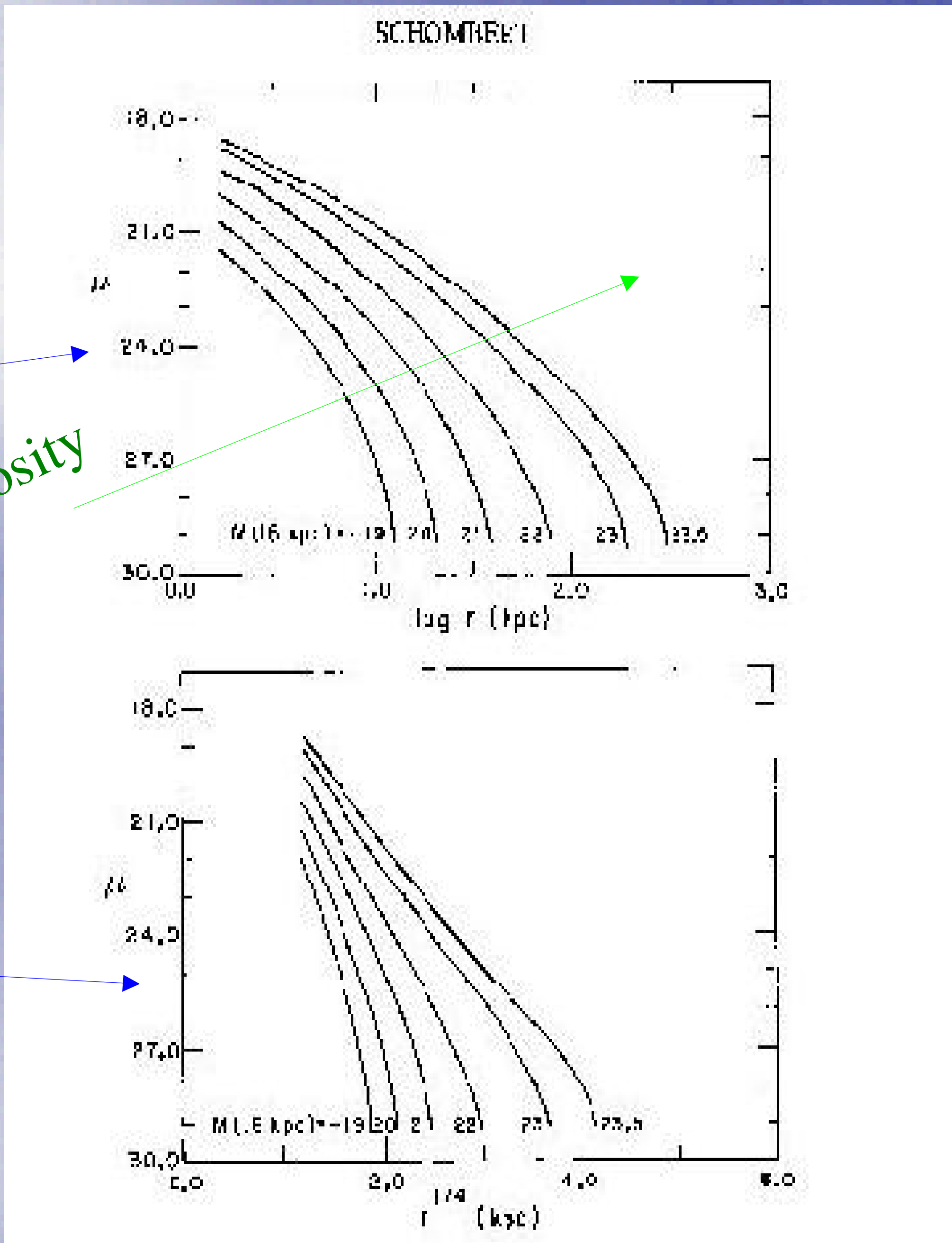
Kim et al. 2000

Profile properties vs. luminosity in dwarf ellipticals

(V-band luminosity within 16 kpc)

vs. r

increasing luminosity



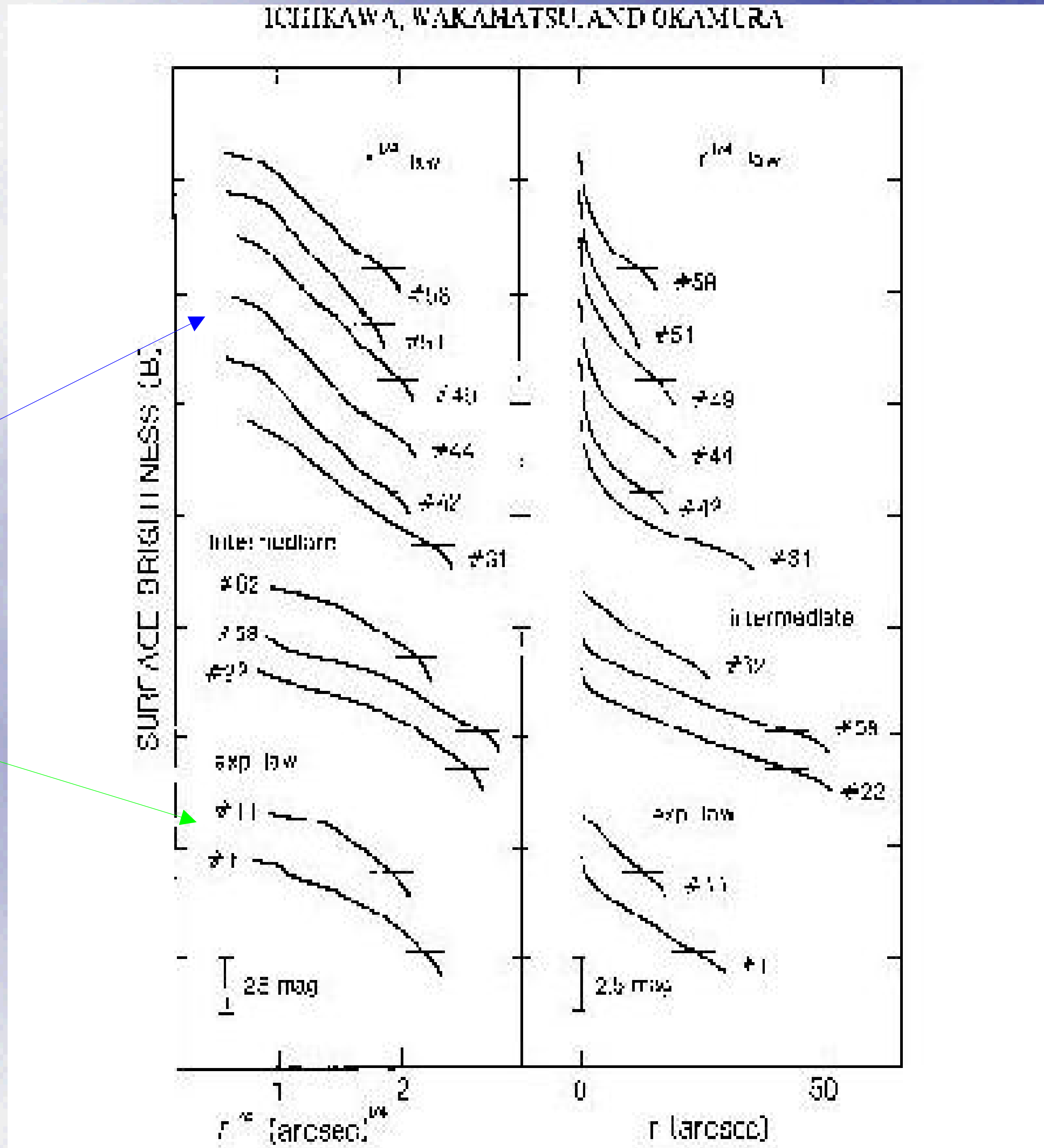
vs. r^(1/4)

Schombert 1986

Profiles of dwarf ellipticals in Virgo:

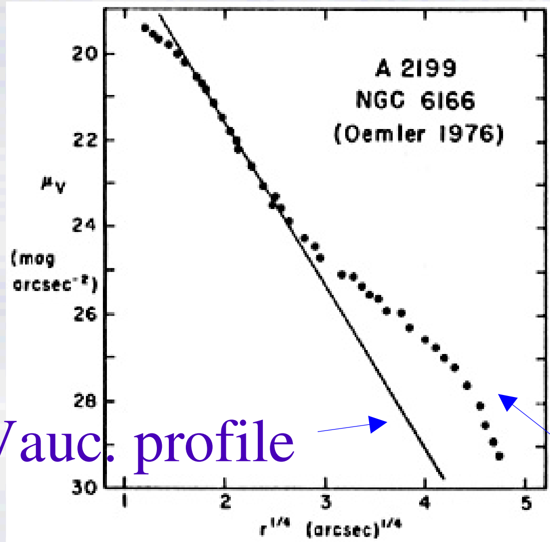
r^1/4 in compact galaxies

exponential profiles in diffuse galaxies



Ichikawa et al 1986

cD galaxies

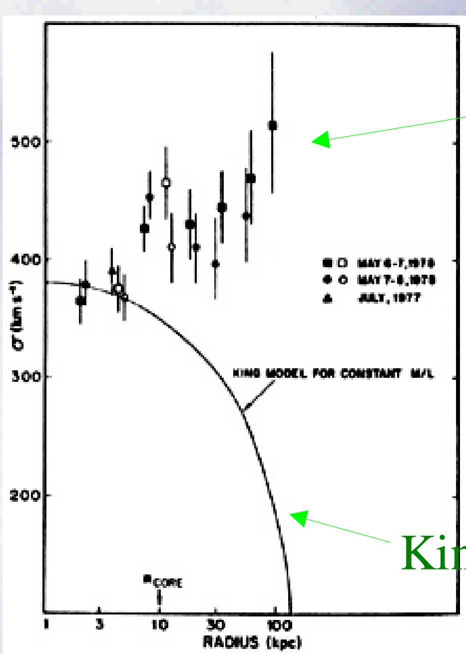


de Vauc. profile

SB profile

halo excess

M87

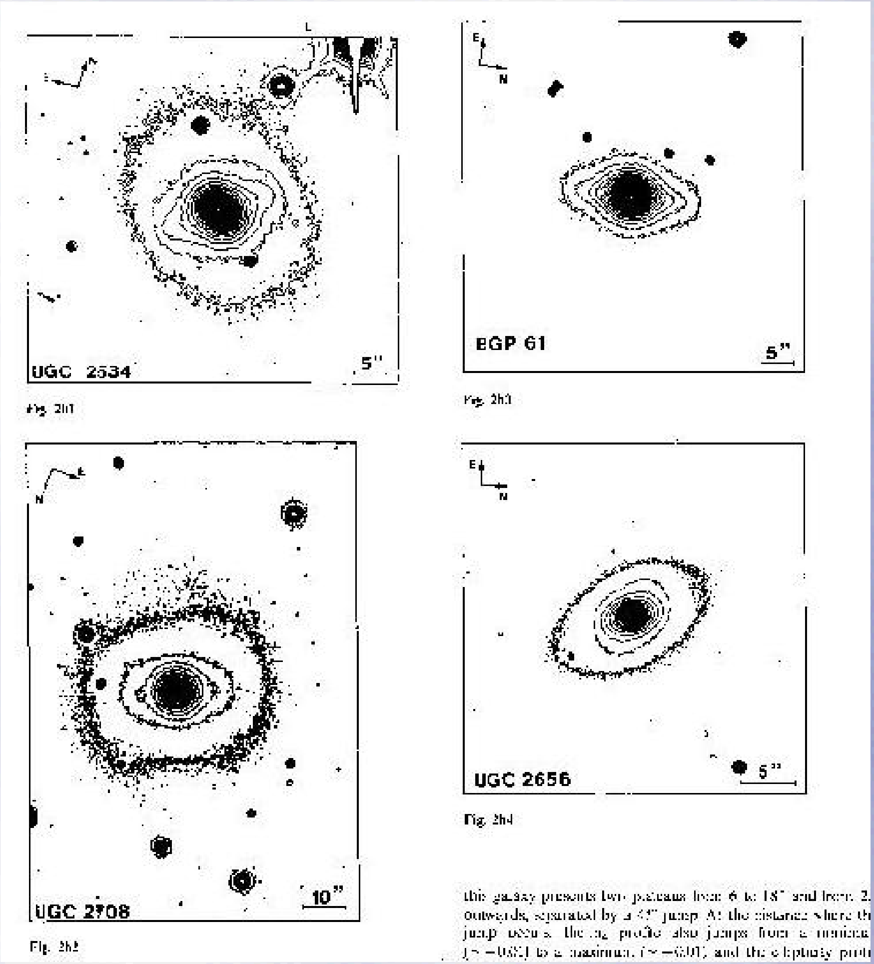


cD data

Velocity dispersion profile

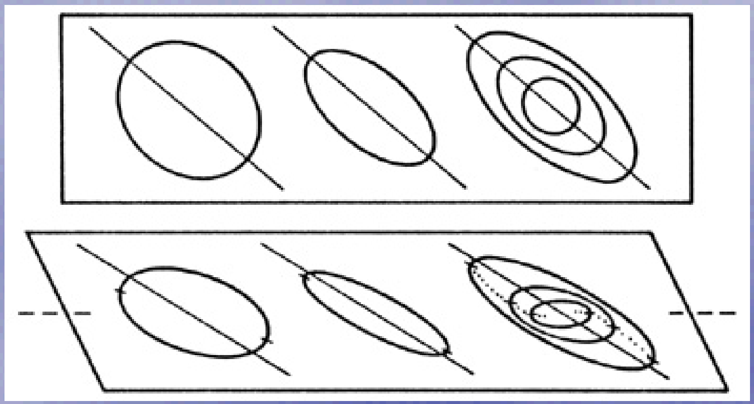
King model for constant M/L

THE TRIAXIAL SHAPES OF ELLIPTICALS



Isophote twist is due to the 2D projection of a triaxial body with concentric ellipses of different ellipticity (Nieto et al 1992)

example of an analogous situation in 2D



The boxy or disky shape of isophotes:

physical property or projection effect?

Ellipticity class

FIGURE 3. — Distribution of the ellipticity classes for all observed elliptical galaxies.

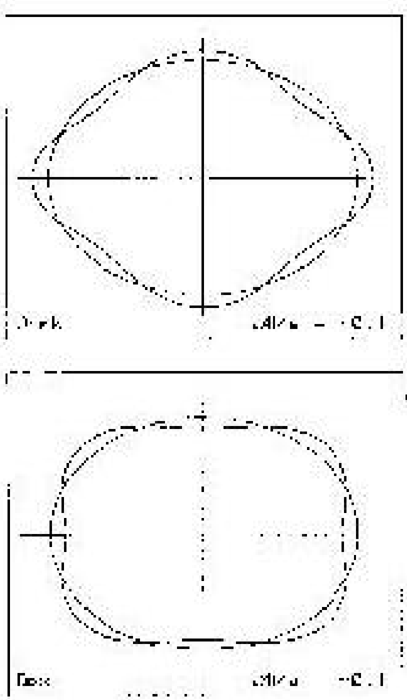


FIGURE 5. — Schematic drawing illustrating isophotes with $a(4)/a = +0.1$ and $a(4)/a = -0.1$

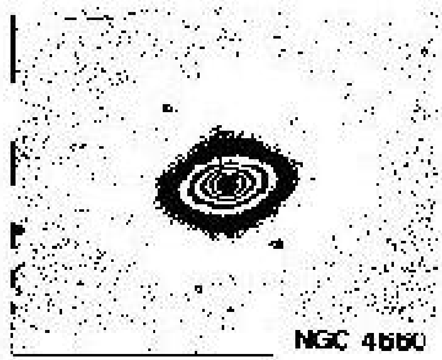


FIGURE 6. — R-image of NGC 4660, an elliptical galaxy with a disk component in the isophotes ($a(4)/a \approx 0.03$).

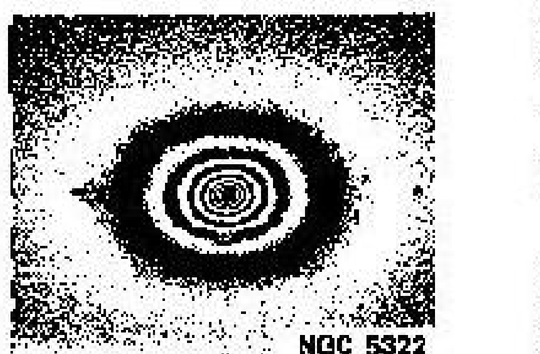


FIGURE 7. — R-image of NGC 5322, an elliptical galaxy with boxshaped isophotes ($a(4)/a \approx -0.5?$).

DISKY

BOXY

(Bender et al 1988)

The colour-magnitude relation for ellipticals

(Virgo & Coma)

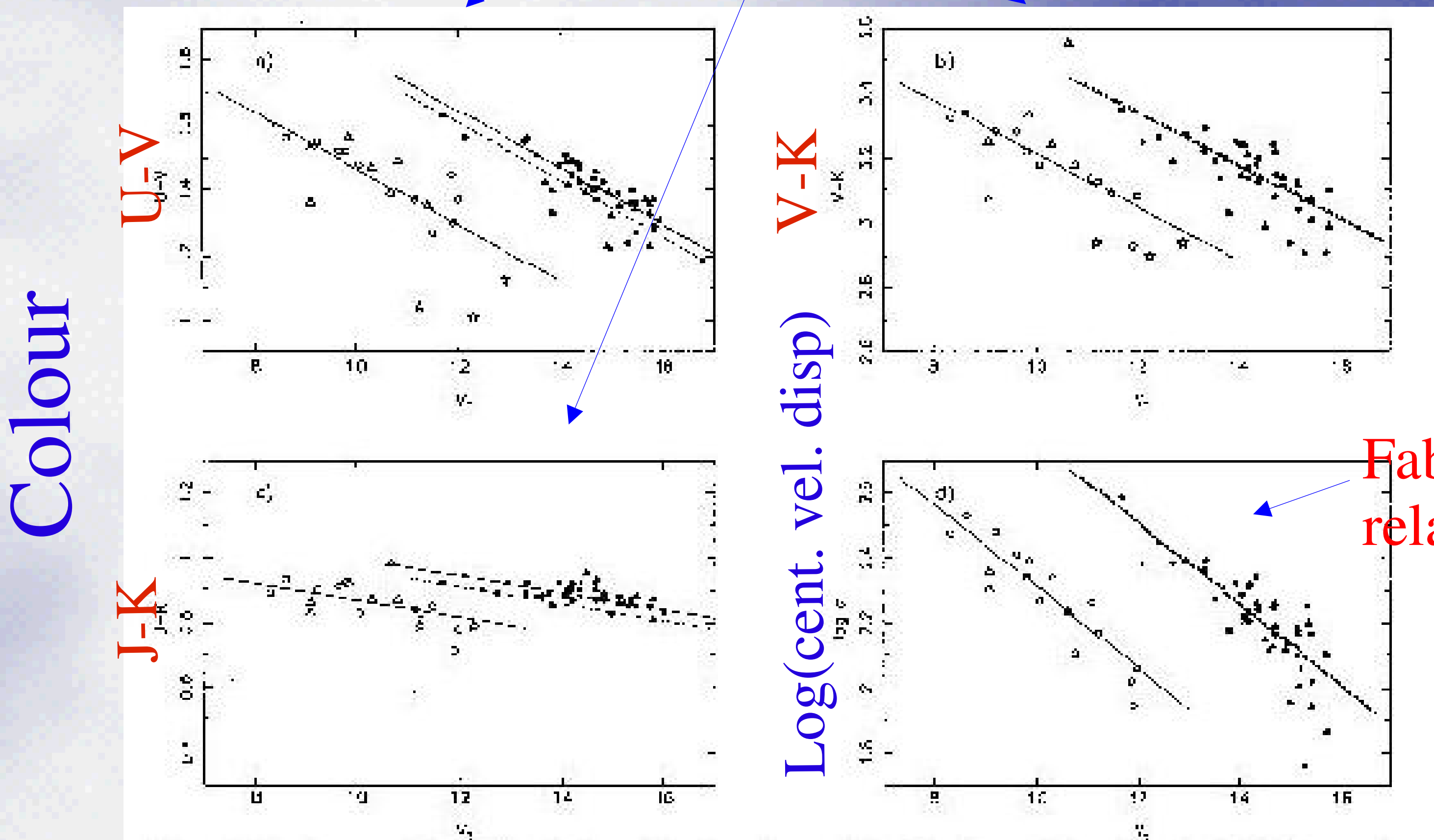


Figure 1. The colour–magnitude and Faber–Jackson relations for early-type galaxies in the Virgo and Coma clusters: (a) U − V colour–magnitude; (b) V − K colour–magnitude; (c) J − K colour–magnitude; (d) the Faber–Jackson relation. The data are taken from tables 1 and 2 of Paper I. Open symbols denote galaxies in the Virgo cluster; filled symbols, galaxies in the Coma cluster. The symbols used denote galaxies of different morphological types – circles, elliptical; triangles, S0; stars, S0/a or Sa. The solid lines show the median fit of a line with slope given in Table 2 (fitting to the full data set). The slope adopted is a compromise between the gradients of the separate best-fit lines of each cluster. The dashed lines show the expected relations in the Coma cluster predicted from the Virgo cluster zero-point plus an adopted relative distance modulus of 3.60.

(Bower, Lucey & Ellis 1992)

Magnitude (V)

THE FUNDAMENTAL PLANE OF ELLIPTICALS

Radius-SB

Faber-Jackson

The FP face-on
(SB-vel. disp.)

The FP edge-on

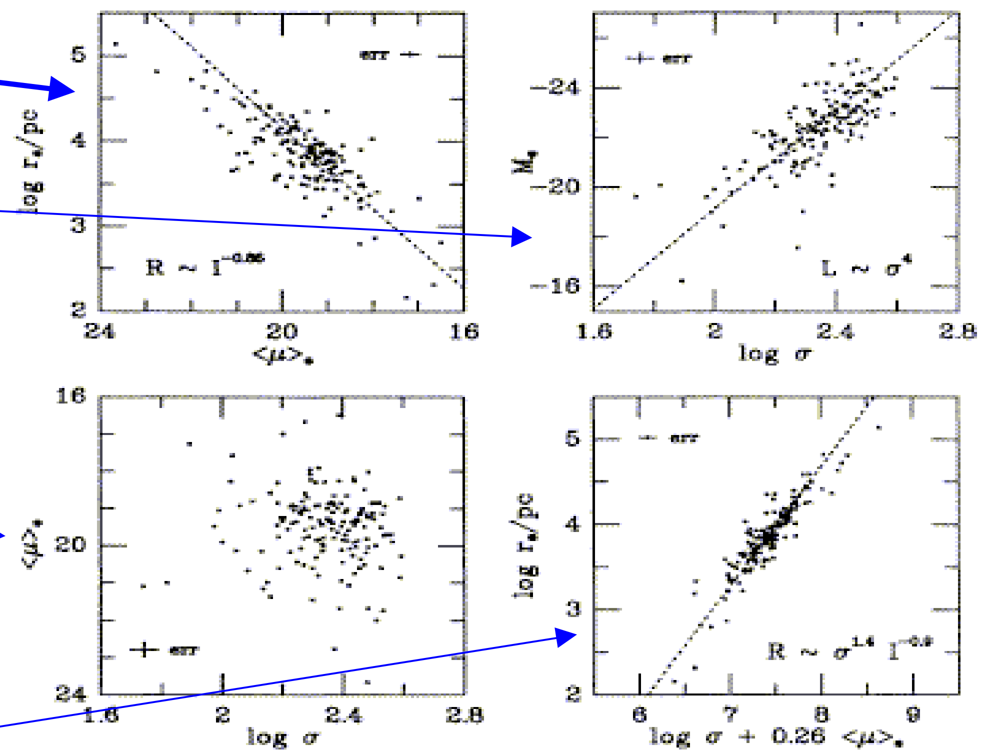


Figure 2 Projections of the fundamental parameter plane of elliptical galaxies. *Top panels*: the one-parameter scaling relations discussed in Section 8.2, i.e. (*left*) the relation between radius and mean surface brightness, and (*right*) that between luminosity and velocity dispersion (the Faber-Jackson relation). *Bottom left*: the surface brightness–velocity dispersion correlation is the fundamental plane seen almost face-on. This is an observer's version of the cooling diagram from theories of galaxy formation. *Bottom right*: this relation between the radius and a combination of surface brightness and velocity dispersion is the fundamental plane seen edge-on. The data are from Djorgovski & Davis (1987). All photometric quantities are in the Lick r_G band and are measured at or within the r_e elliptical isophote. The crosses are median error bars for all points in each panel.

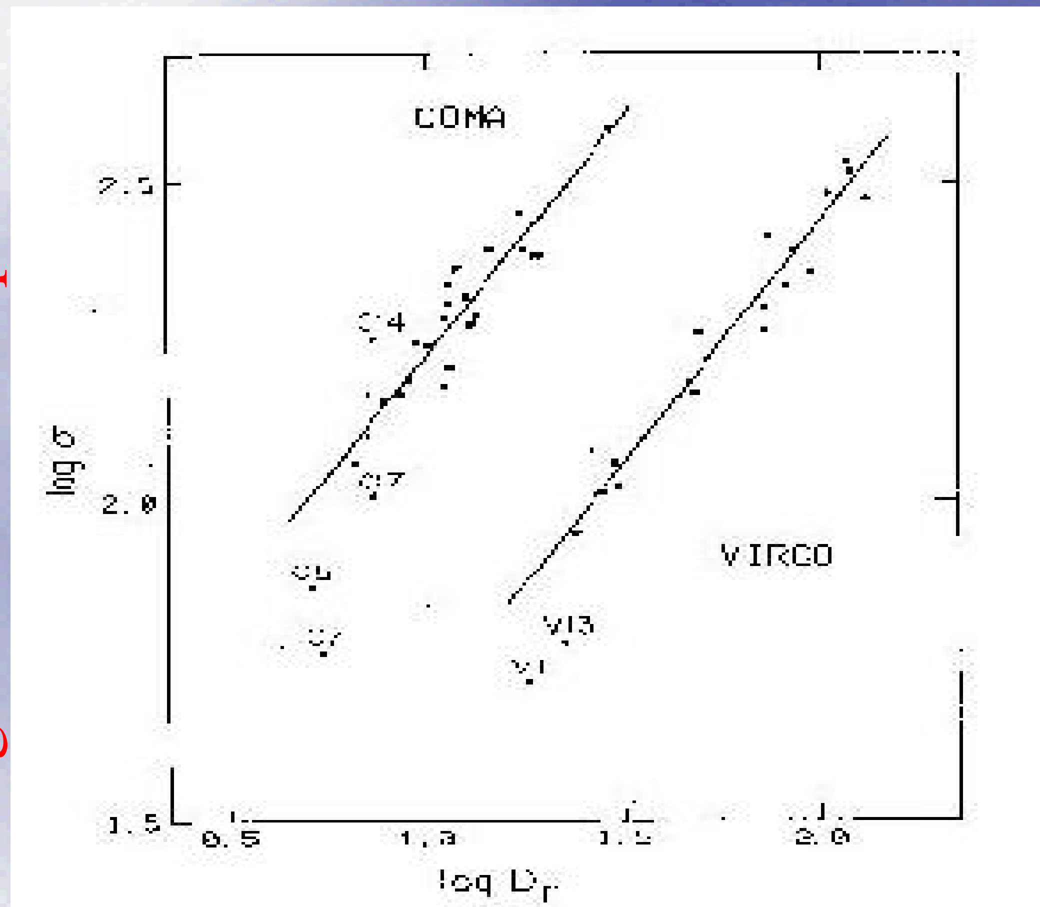
(Kormendy & Djorgovski 1989)

An Application of the FP:

The D_n- σ Relation

I(<Dn/2) =
= 20.75 mag/arcsec^2
(B-band)

log central vel. disp.



log Dn

(Dressler et al. 1987)