Fitting the <u>2-D image</u> (rather than the 1-D azimuthally averaged SB profile) with a 2-D (de Vaucouleurs + Exponential) model

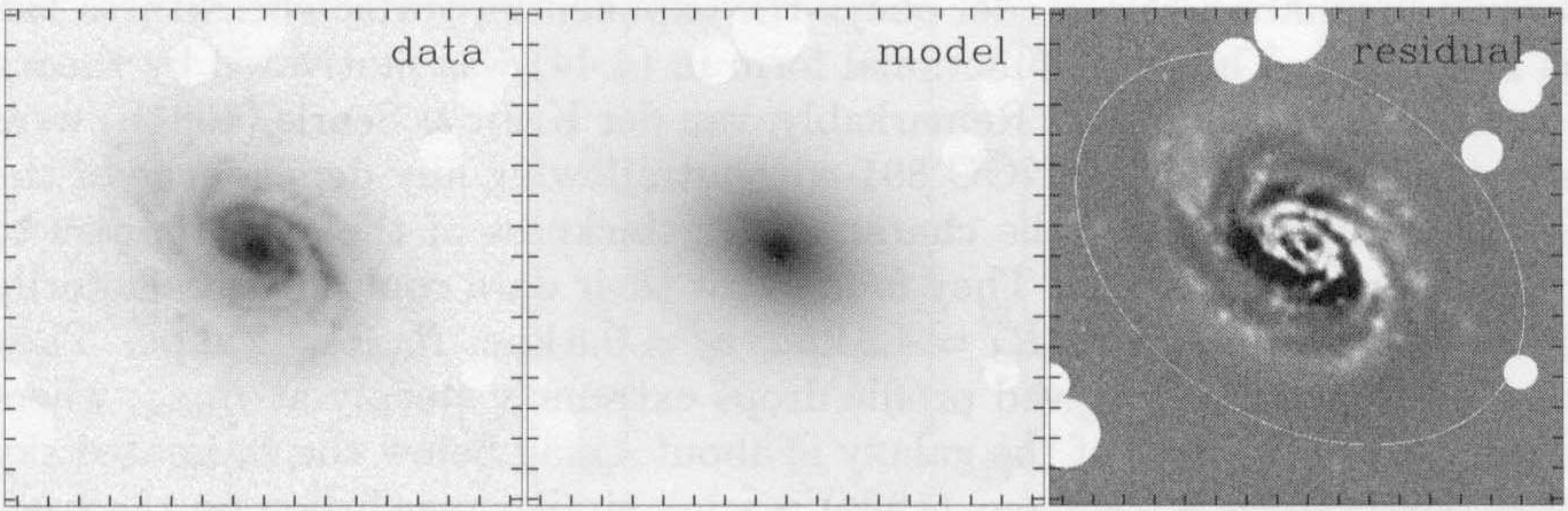


Figure 4.49 Modeling photometry of a galaxy in two dimensions. The left panel shows a B-band CCD image of NGC 214; the middle panel shows the projection onto the sky of the best-fitting combination of an exponential disk and an $R^{1/4}$-law bulge; and the right panel shows the residuals after this model has been subtracted. The tick marks are at 10 arcsec intervals. The ellipse in the right panel is the region over which the fit was performed, and the empty circles are regions that were excluded because they are contaminated by light from other objects. [Data kindly provided by R. de Jong]

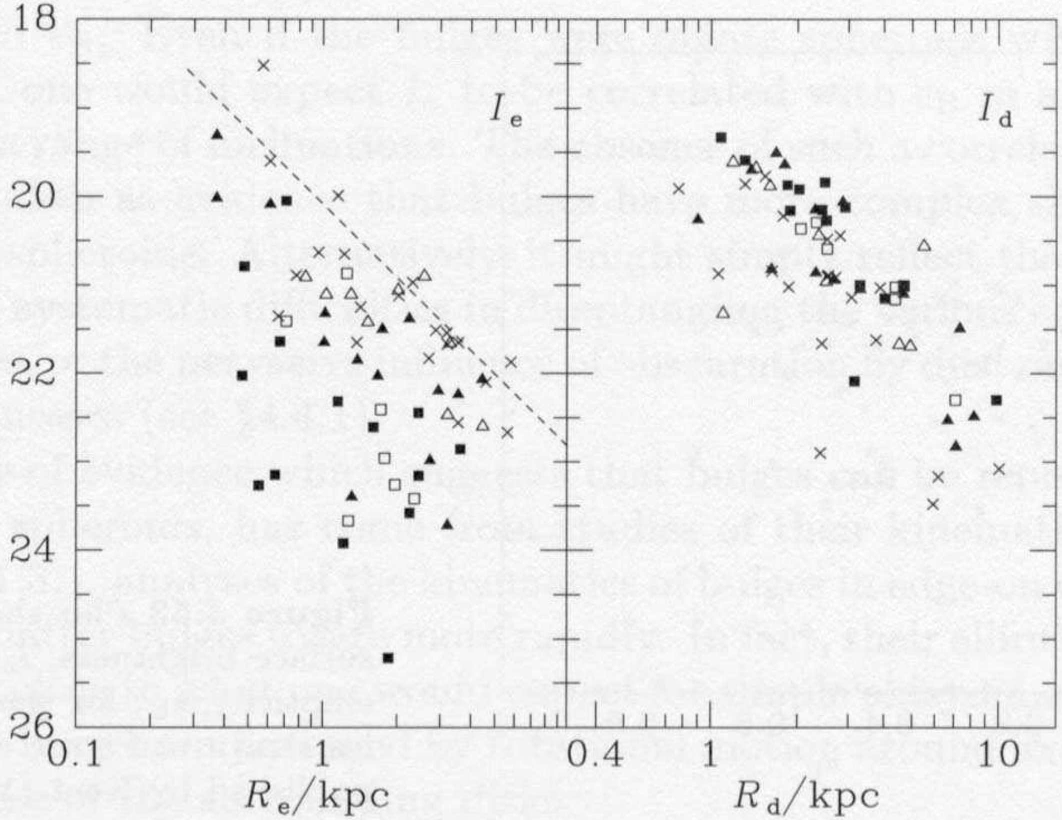


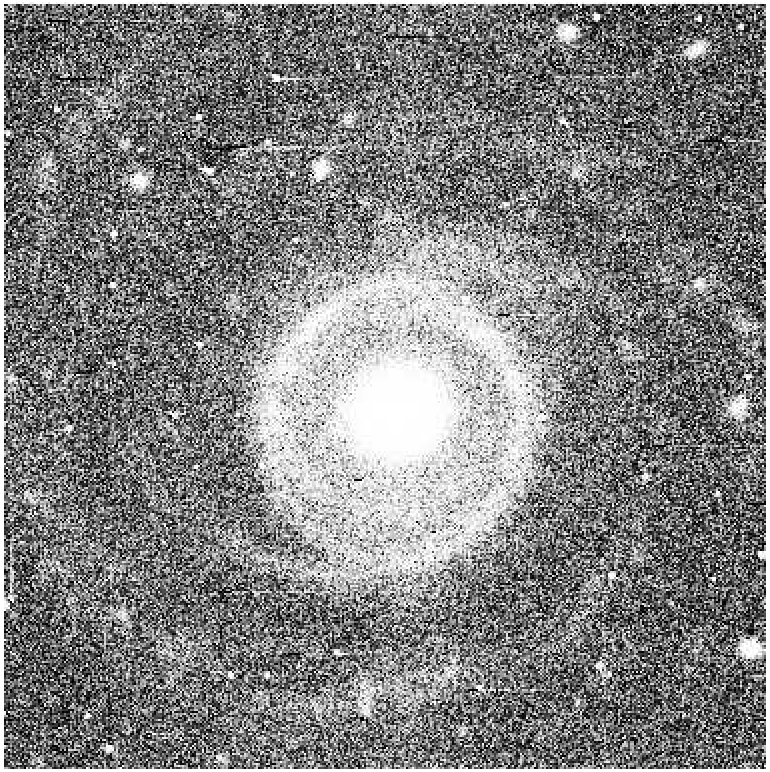
Figure 4.52 The distribution of 66 disk galaxies in analogs of the lower left panel of Figure 4.43. The left panel shows the surface-brightnesses and effective radii of the bulges, while the right panel shows the corresponding disk parameters. Different symbols correspond to galaxies of different Hubble types: S0 (crosses); Sa–Sab (open triangles); Sb (filled triangles); Sbc (open squares); Sc–Scd (filled squares). If the ellipticals of Figure 4.43 were to be plotted in the left-hand panel, they would cluster around the dashed line. [From data published by Kent (1985), who adopts $H_0 = 100\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$.]

For disk components fitted with exponential fits

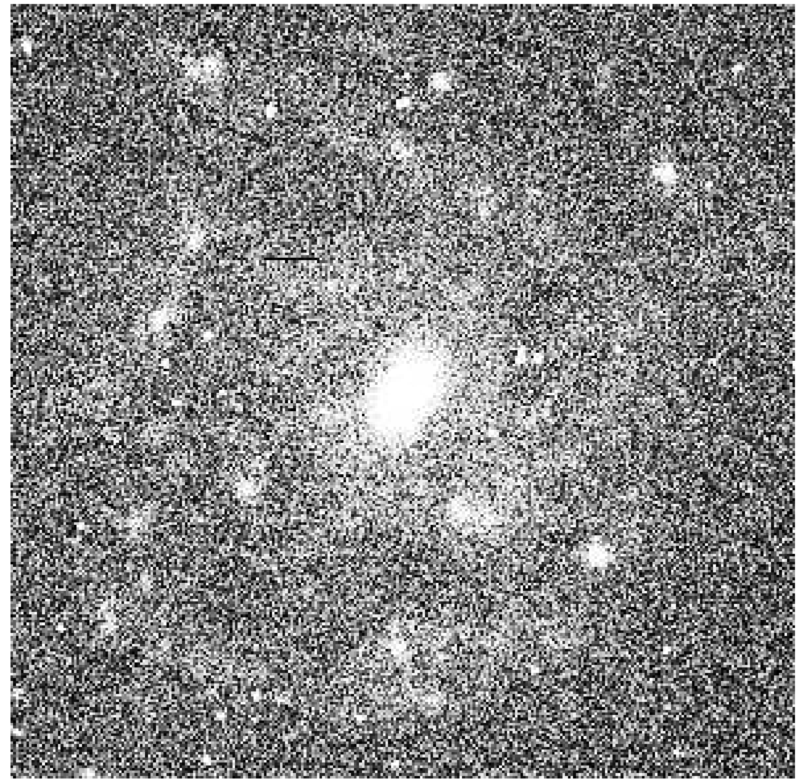
1) larger Rd correlate with lower Io
   à larger disks have lower central SB

2) Central SB have a narrow range clusters around 21.5 aka Freeman's law

LSB giant disk galaxies… not taken into account in Freeman's law !!

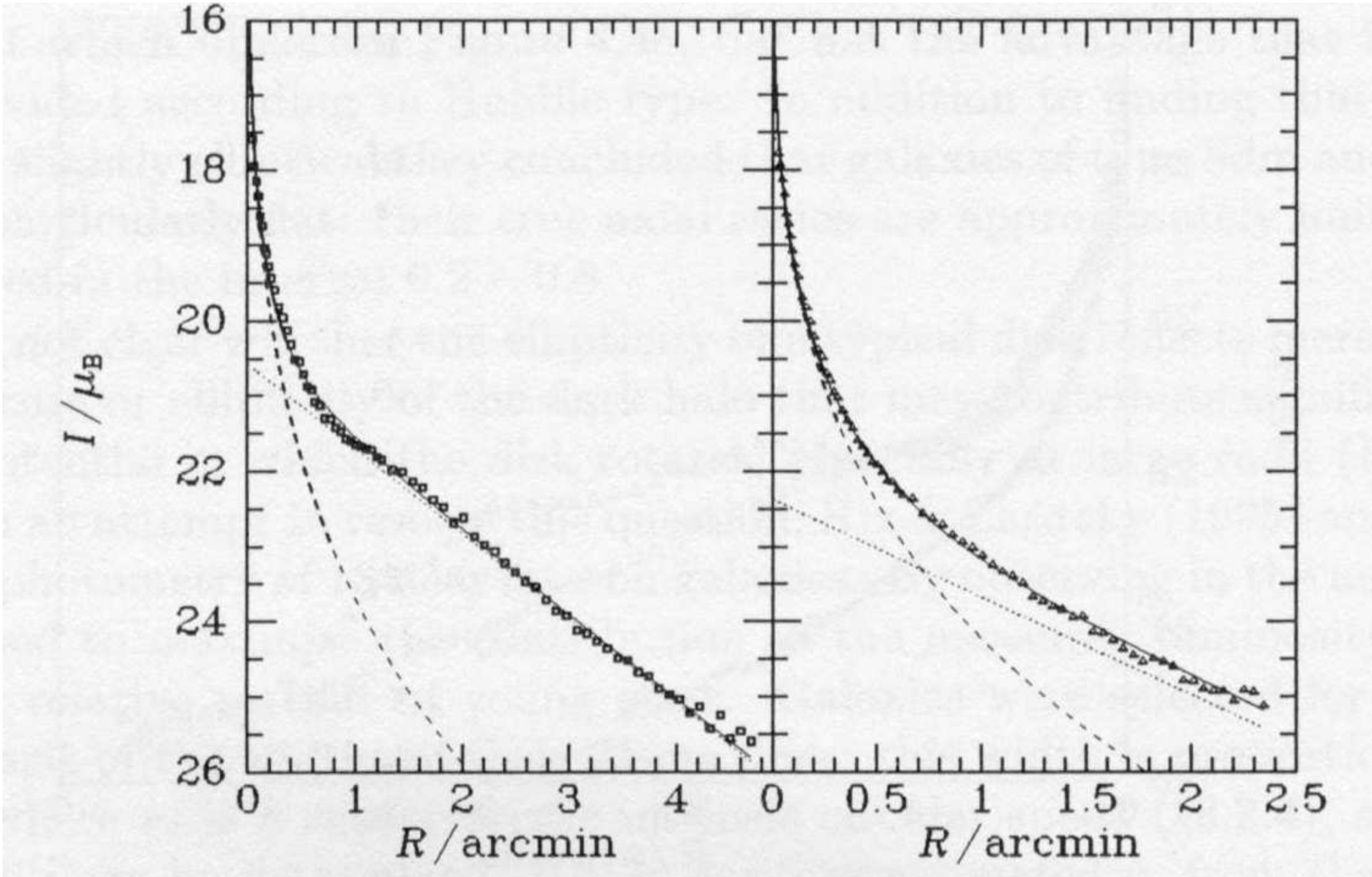


LSB giant galaxy UGC 6614
Central SB = 24.28 mag arcsec-2
Large disk. Rd =? .. Diameter=150 kpc



LSB giant galaxy UGC 9024
Central SB = 24.5 blue mag arcsec-2
Large disk with a scale length Rd of 5.6 kpc

Limitations of (Bulge + Disk) decomposition with a (de Vaucouleurs + Exponential) profile



Diamonds, Triangles = observed B-band surface brightness profiles of 2 spirals
Dotted curve = Exponential fits to disk (depends on bulge light at large r !!)
Dashed curve = De Vaucouleurs fit to bulge (depends on extrapolated disk cpt at low r II)
Solid curve = Exp + de Vauc fit

<u>Limitations</u>: Non-unique solution (Io, Rs, Ie, Re); A priori assumption on shape of bulge as De Vauc, but late type disks have exp bulge ! (better to use generalised Sersic fits); etc