**Aperture Photometry (Stars)**

Measure flux inside aperture of given size $r$, containing $n_{pix}$ pixels.

Estimate sky from avg flux in pixels in surrounding annulus.

$I = \text{sum(counts in aperture)} - \text{sky} \times n_{pix}$

$m = -2.5 \log(I) + \text{calibration terms}$

Optimal size of aperture does not encompass all the light. Need to employ aperture corrections.

0.4” pixels, 1.2” FWHM seeing, Howell et al 1989
Aperture photometry good here.

Aperture photometry not so good here!
PSF Fitting Photometry (Stars)

Model the pointspread function (PSF) based on bright (not saturated!) stars.

Fit the model to individual stars, varying brightness of model to minimize residuals.

Good for crowded fields.

But beware PSF variations (frame-to-frame, across the field of view, etc.)
Surface Photometry
Surface Photometry

Galaxy apertures and Sky apertures – accurate sky estimate is critical!
Surface Photometry

$m = -2.5\log(I) + \text{calibration terms}$

$\mu = m + 2.5\log(\text{area})$

Spiral galaxies: exponential disks

so $\mu$ vs $r$ should be straight line.
Surface Photometry
Surface Photometry
Surface Photometry

Elliptical galaxies: not exponential, classically $r^{1/4}$ or, now, Sersic profiles

Plot $\mu$ as a function of $r^{1/4}$ or $\log(r)$