

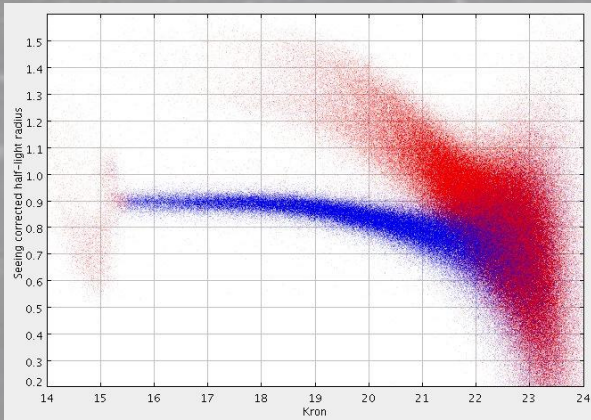
Tests of Star Galaxy Separation



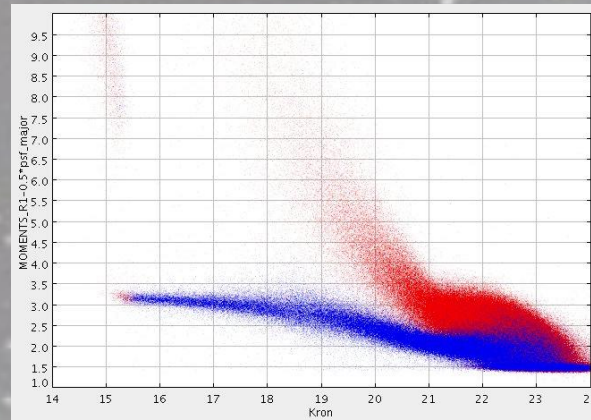
Durham PS1SC Extragalactic Workshop – January 2013

Assorted S/G separators

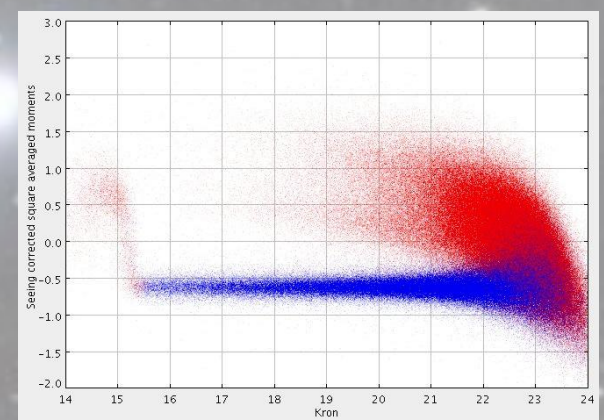
SAS2 - Blue: Stripe 82 stars; Red: Stripe 82 galaxies



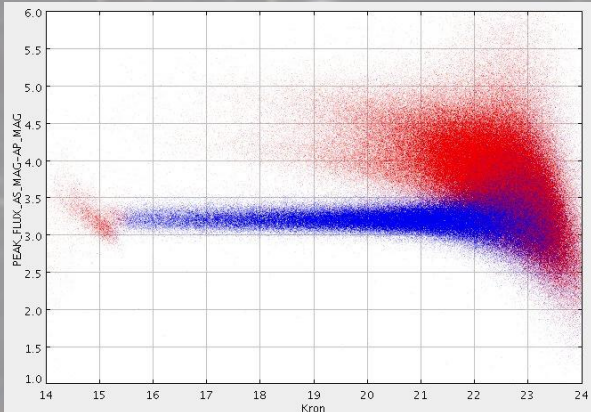
Half-light radius



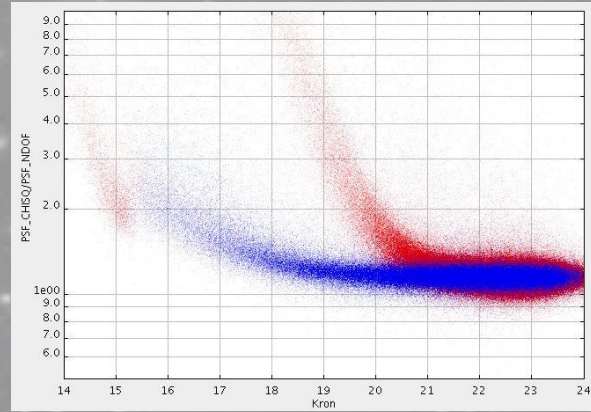
Kron radius



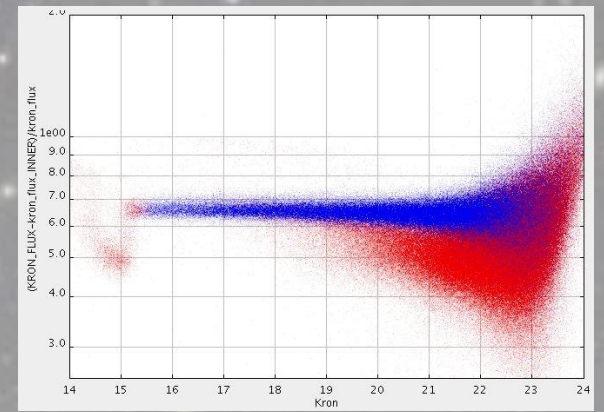
x^2+y^2 moments



Peak flux – ap mag

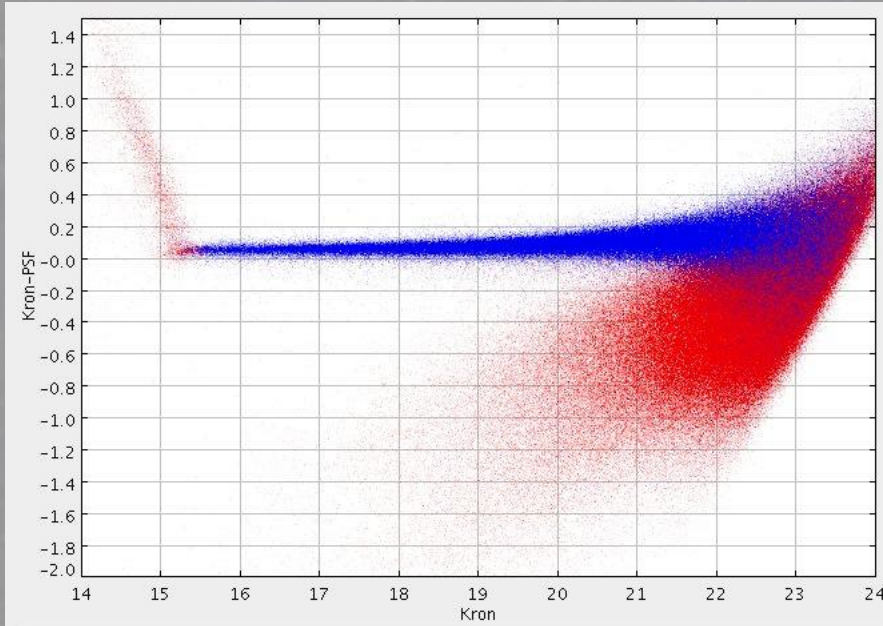


Chi squared/NDOF



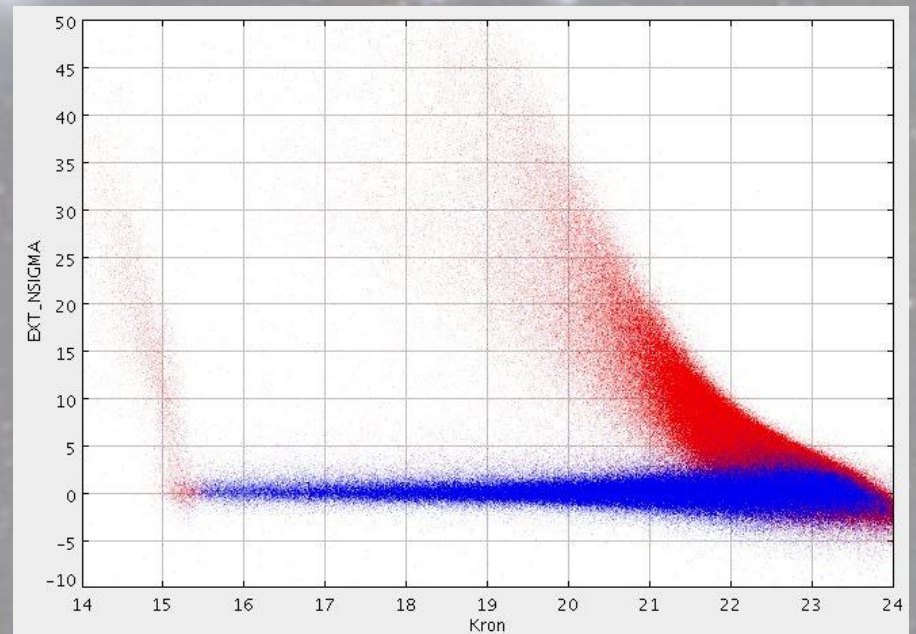
Kron flux ratio

Best separators?



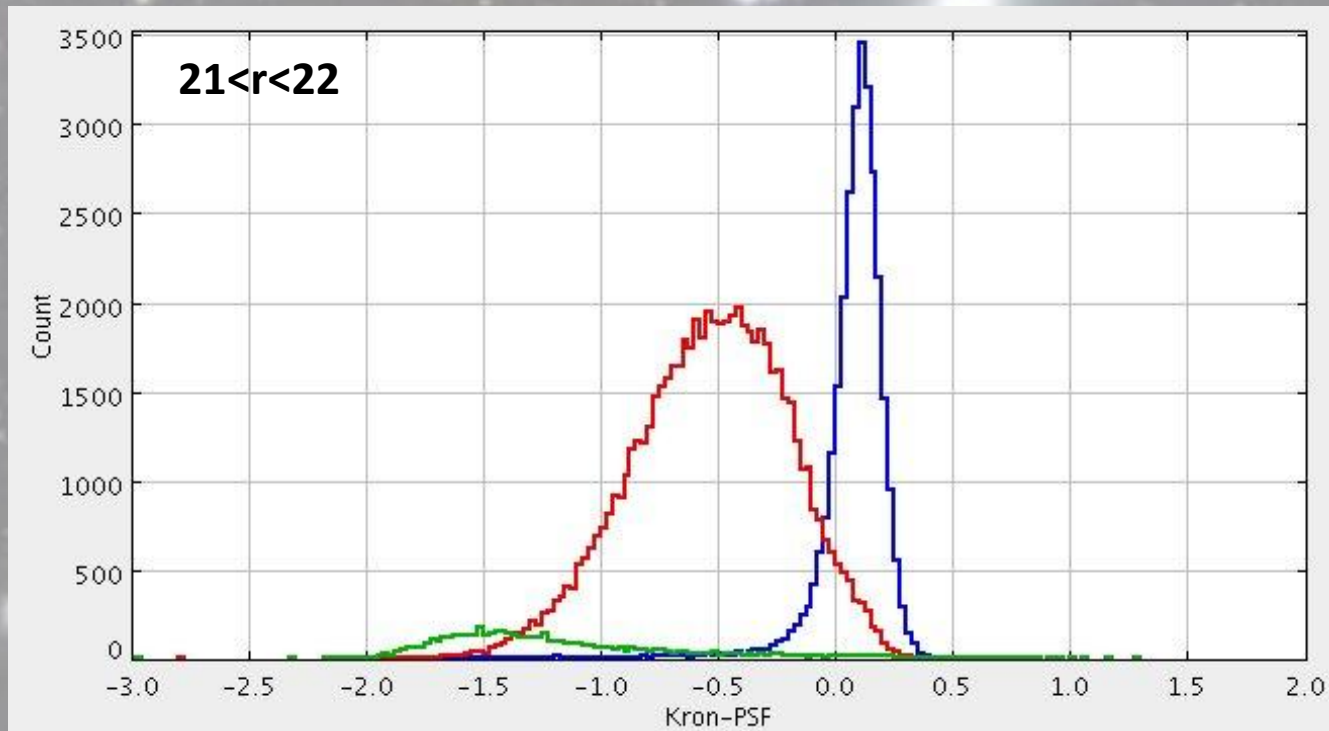
Kron - CAL_PSF_MAG

EXT_NSIGMA



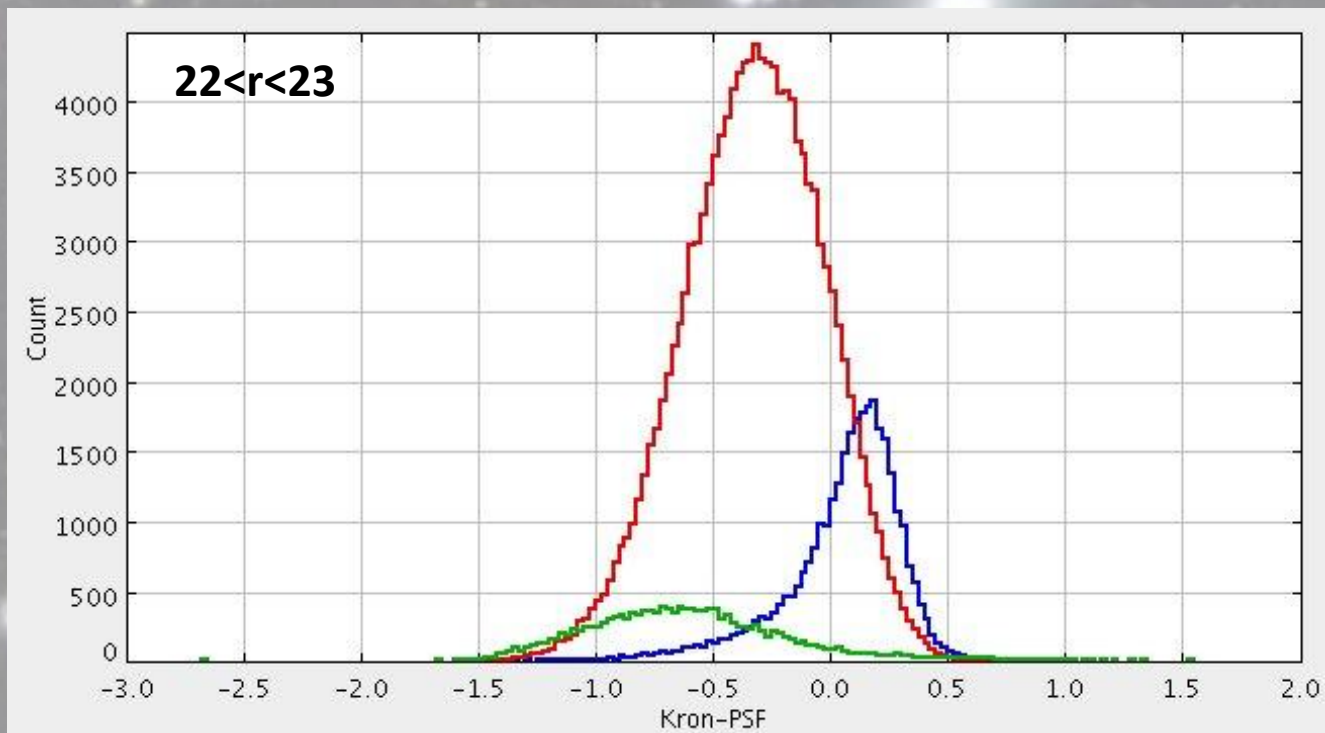
Kron-PSF

Blue - galaxies; red – stars; green - unmatched

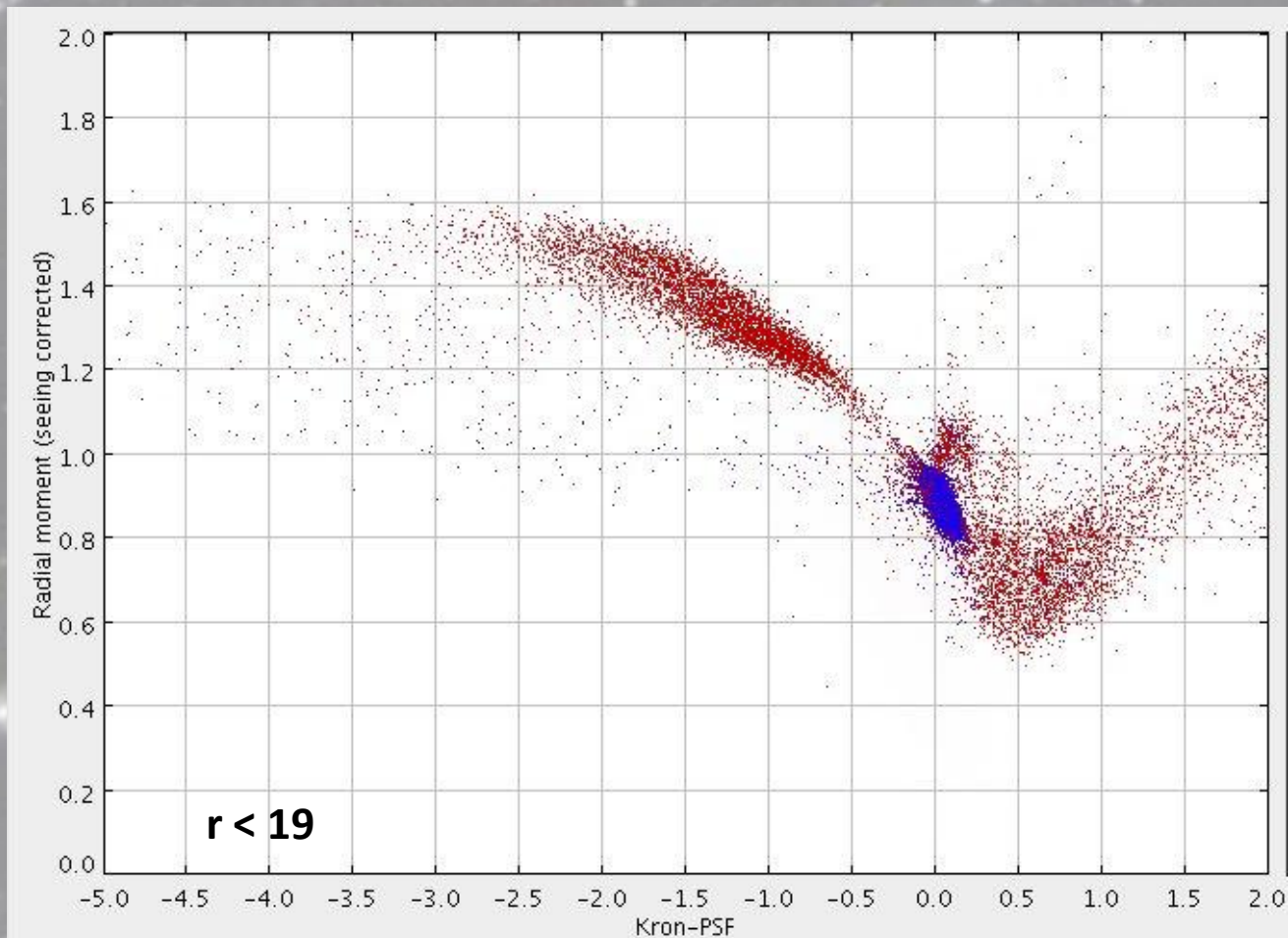


Matched to Stripe 82 – assume this is the ‘truth’.

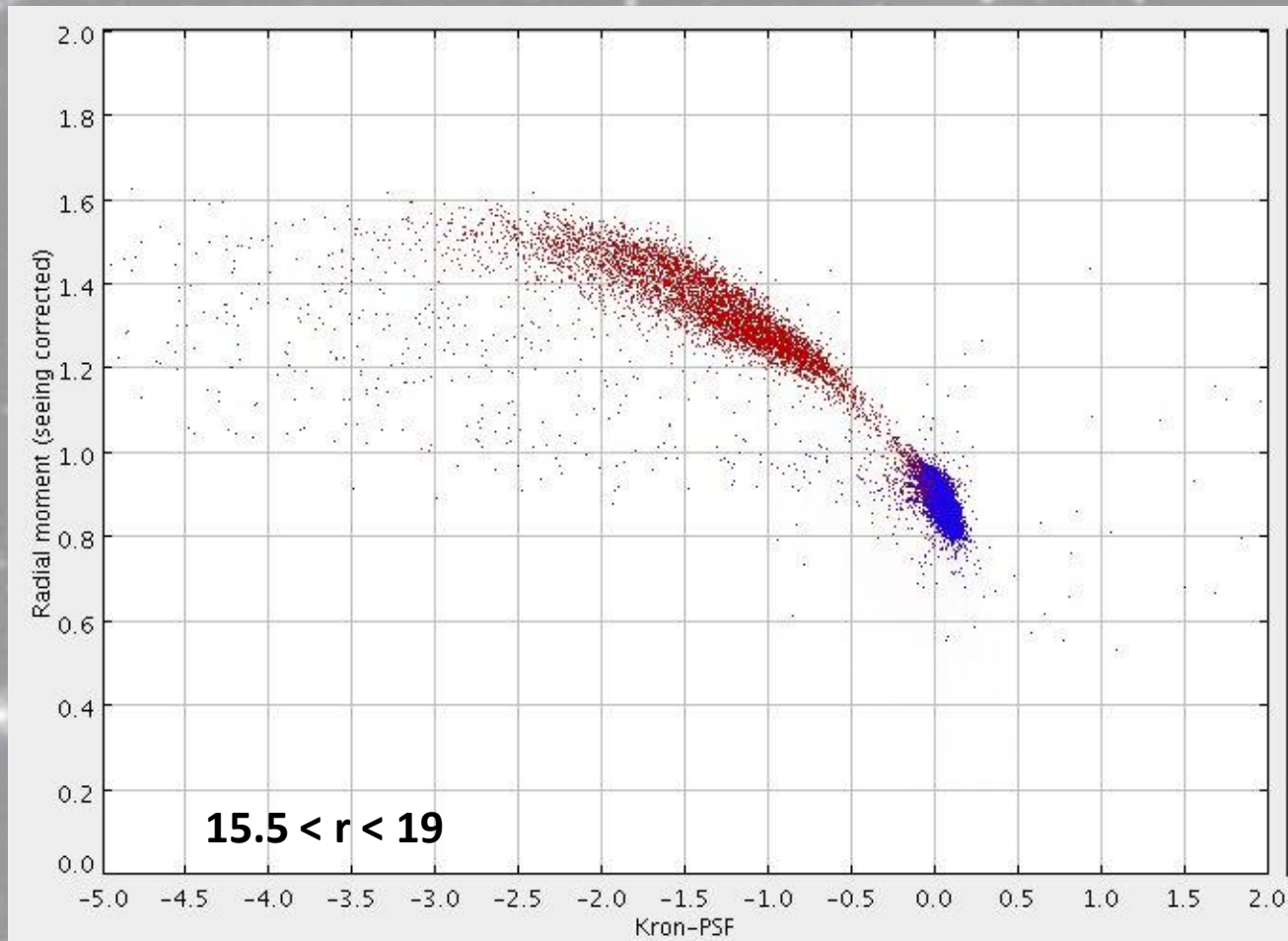
Kron-PSF



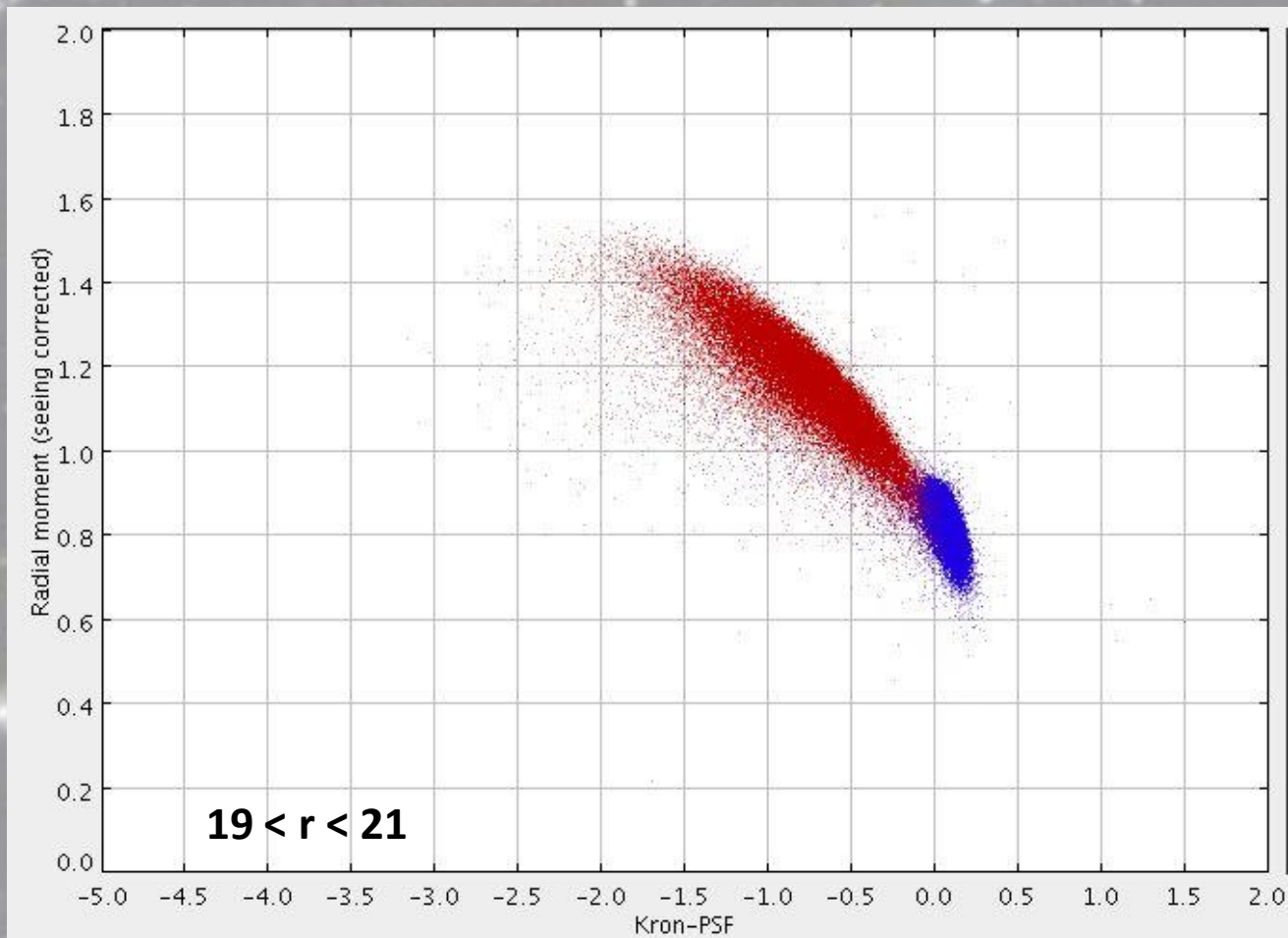
Kron-PSF v half light radius



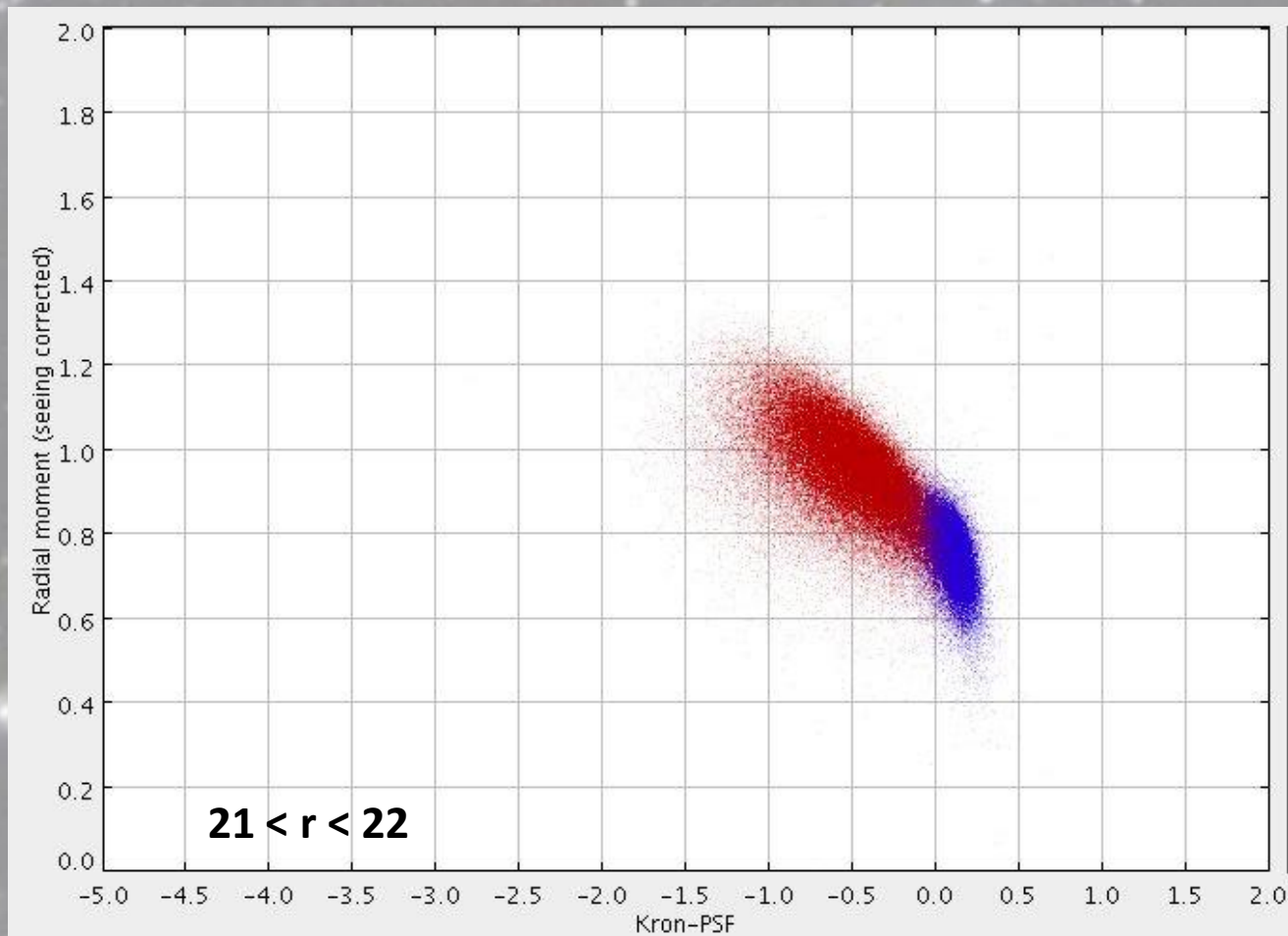
Kron-PSF v half light radius



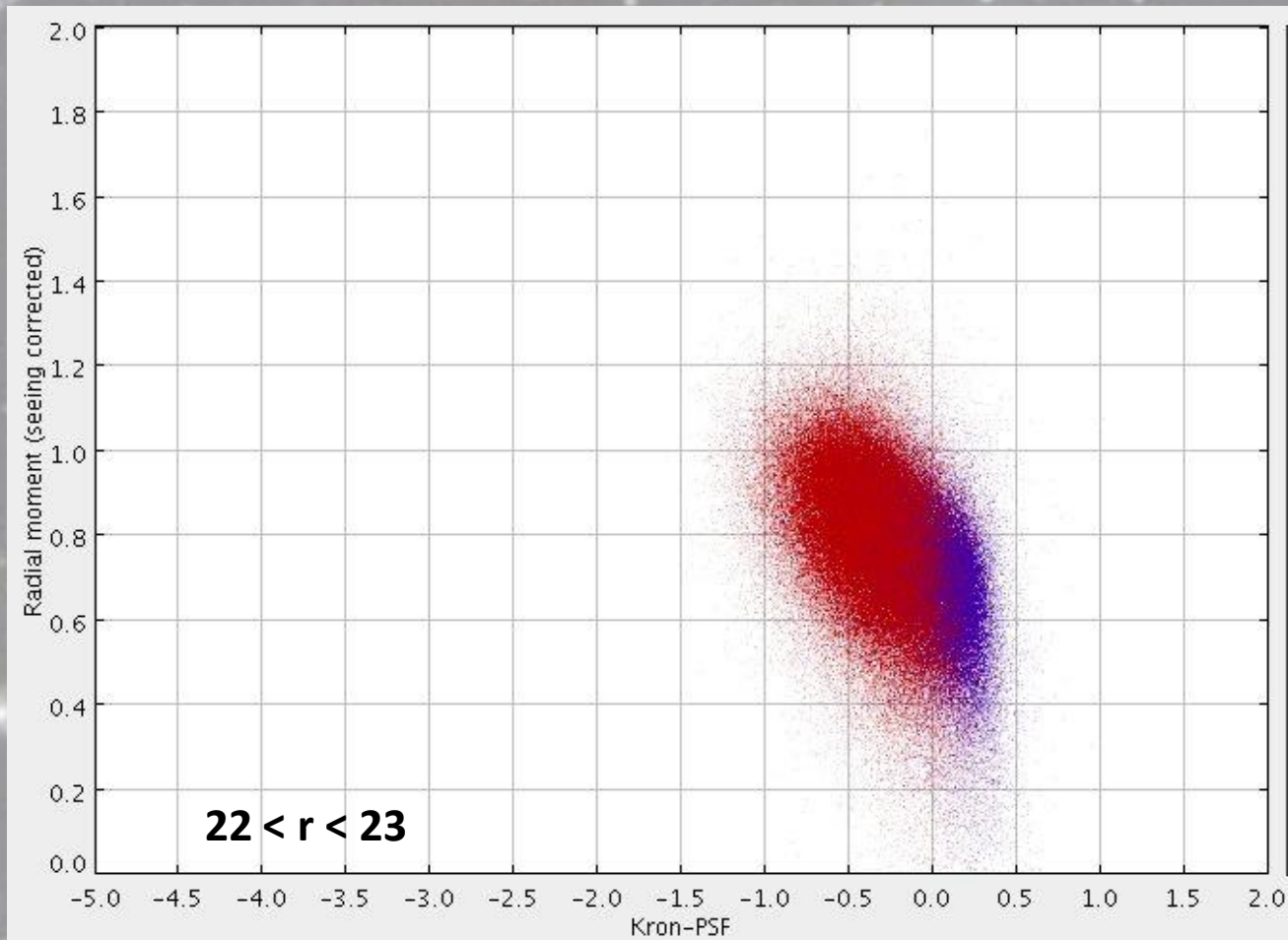
Kron-PSF v half light radius



Kron-PSF v half light radius



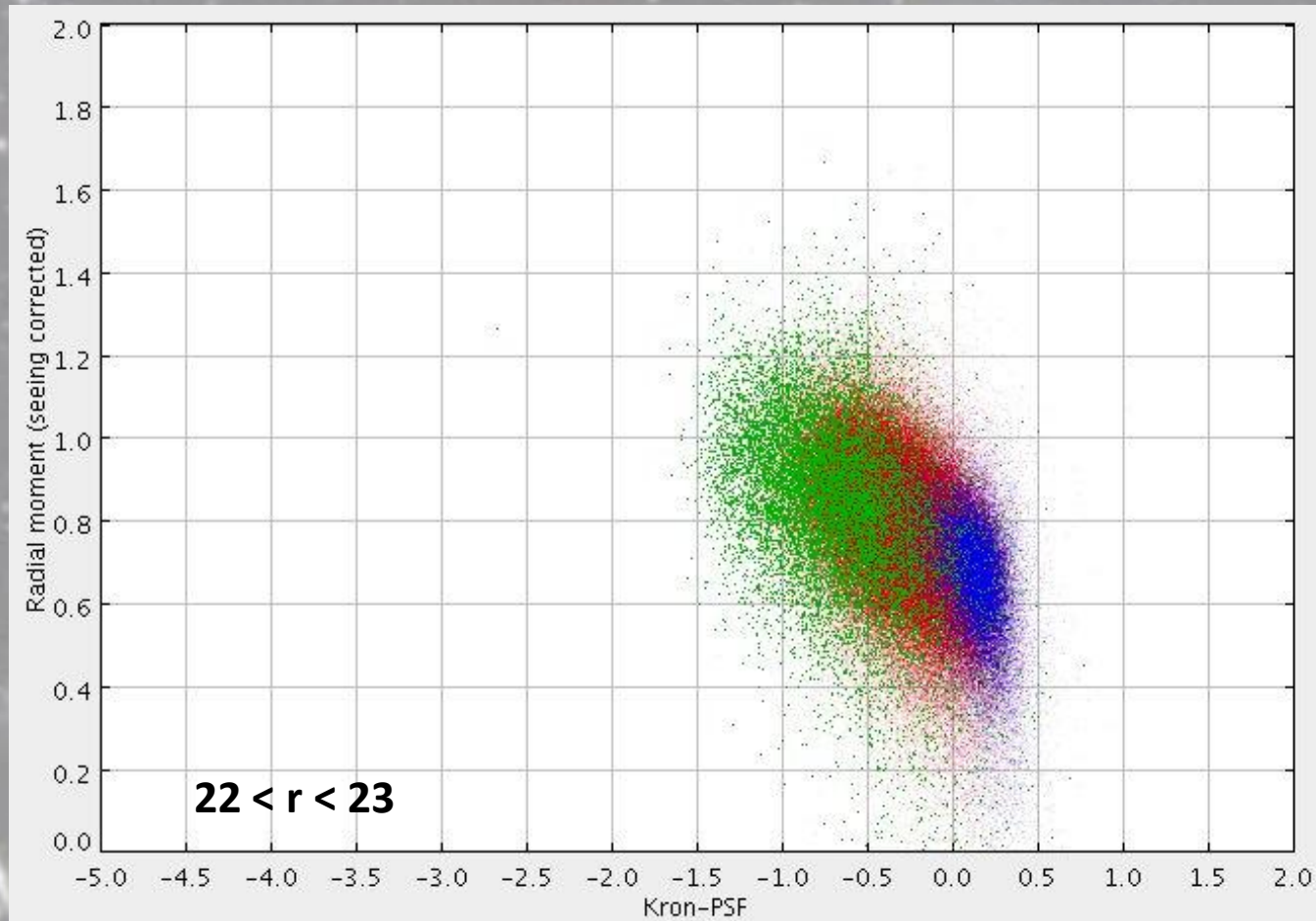
Kron-PSF v radius



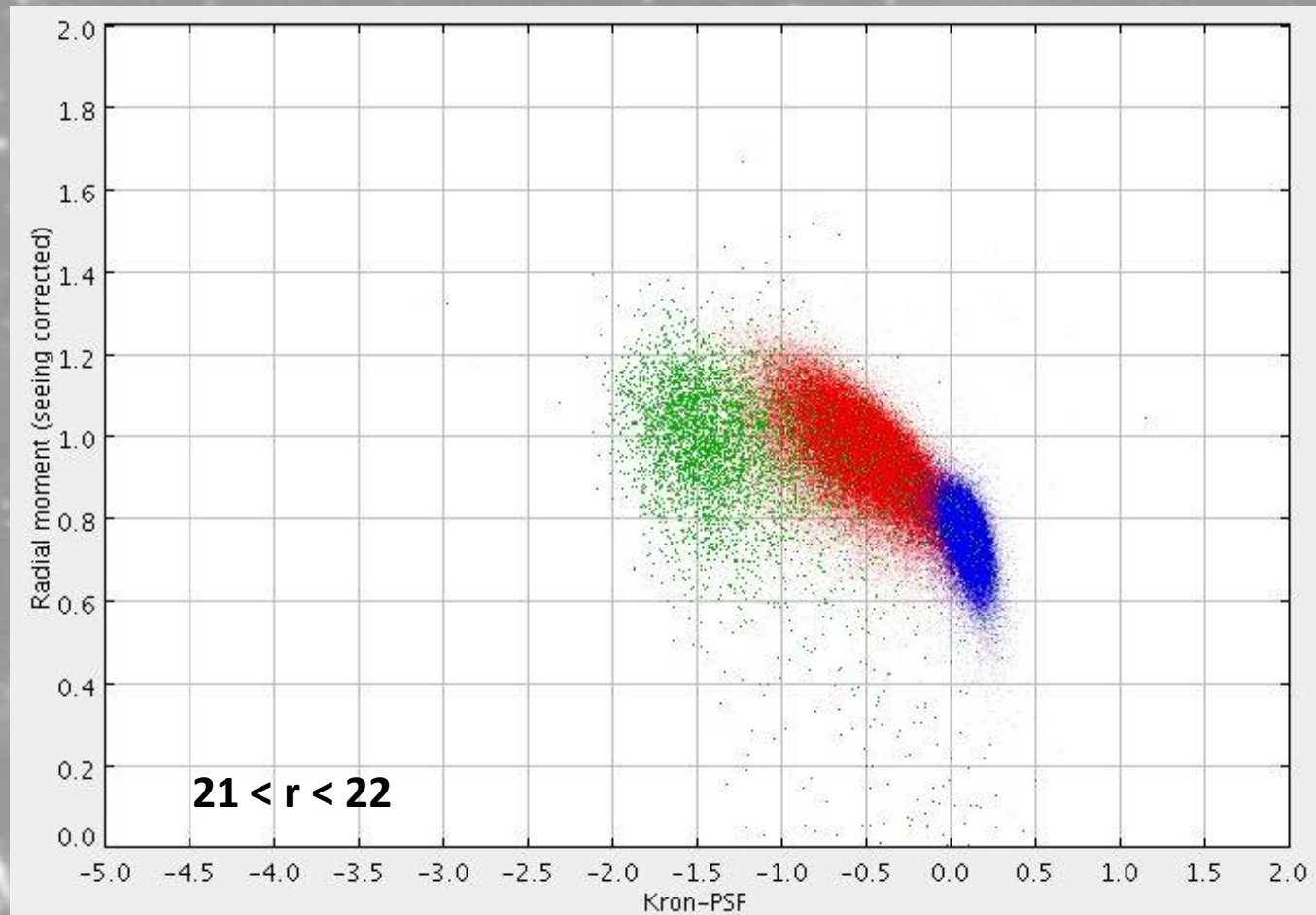
Loci move with magnitude – so need separator to be mag dependent

Kron-PSF v half light radius

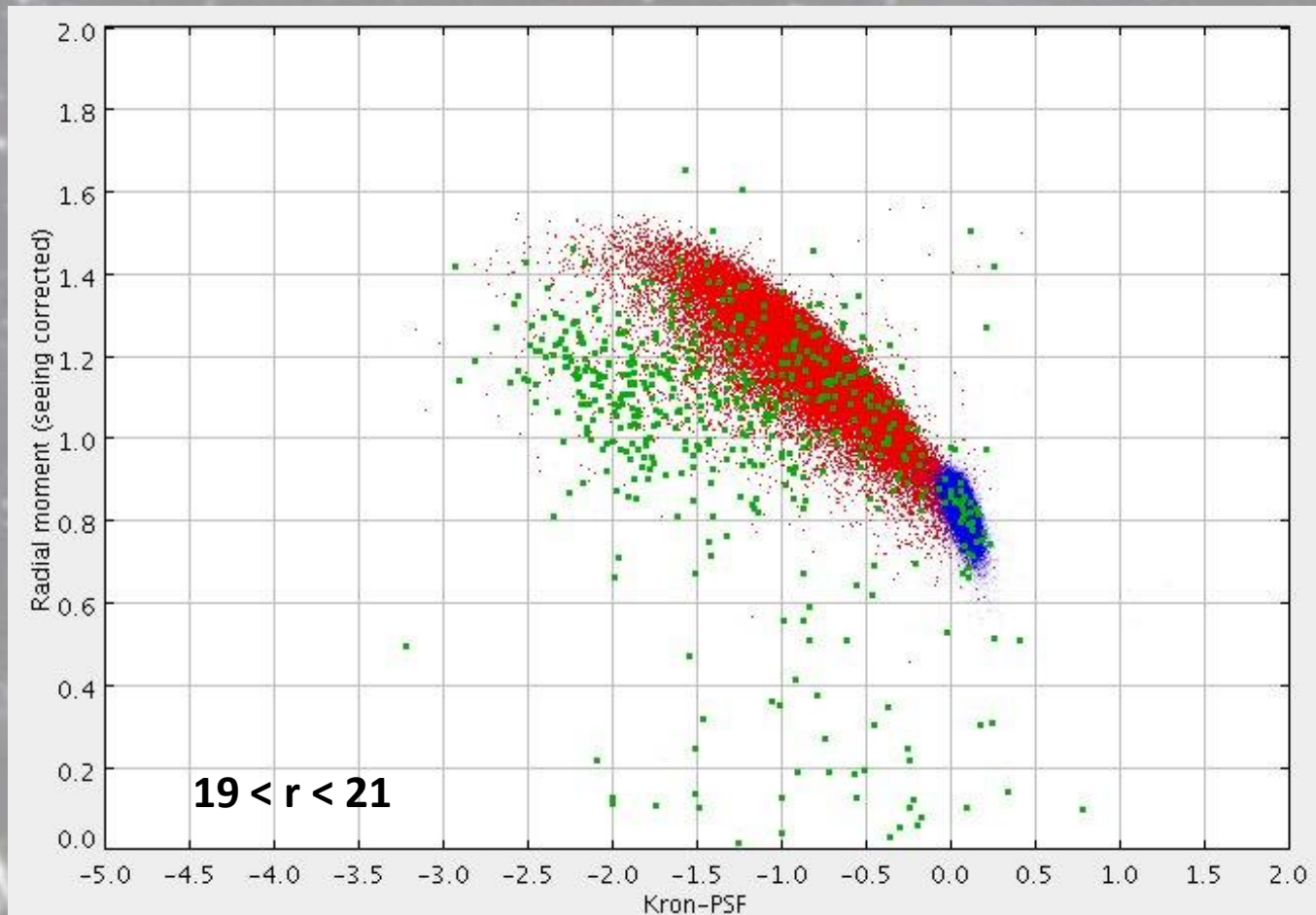
Green – unmatched detections *after* flag cuts



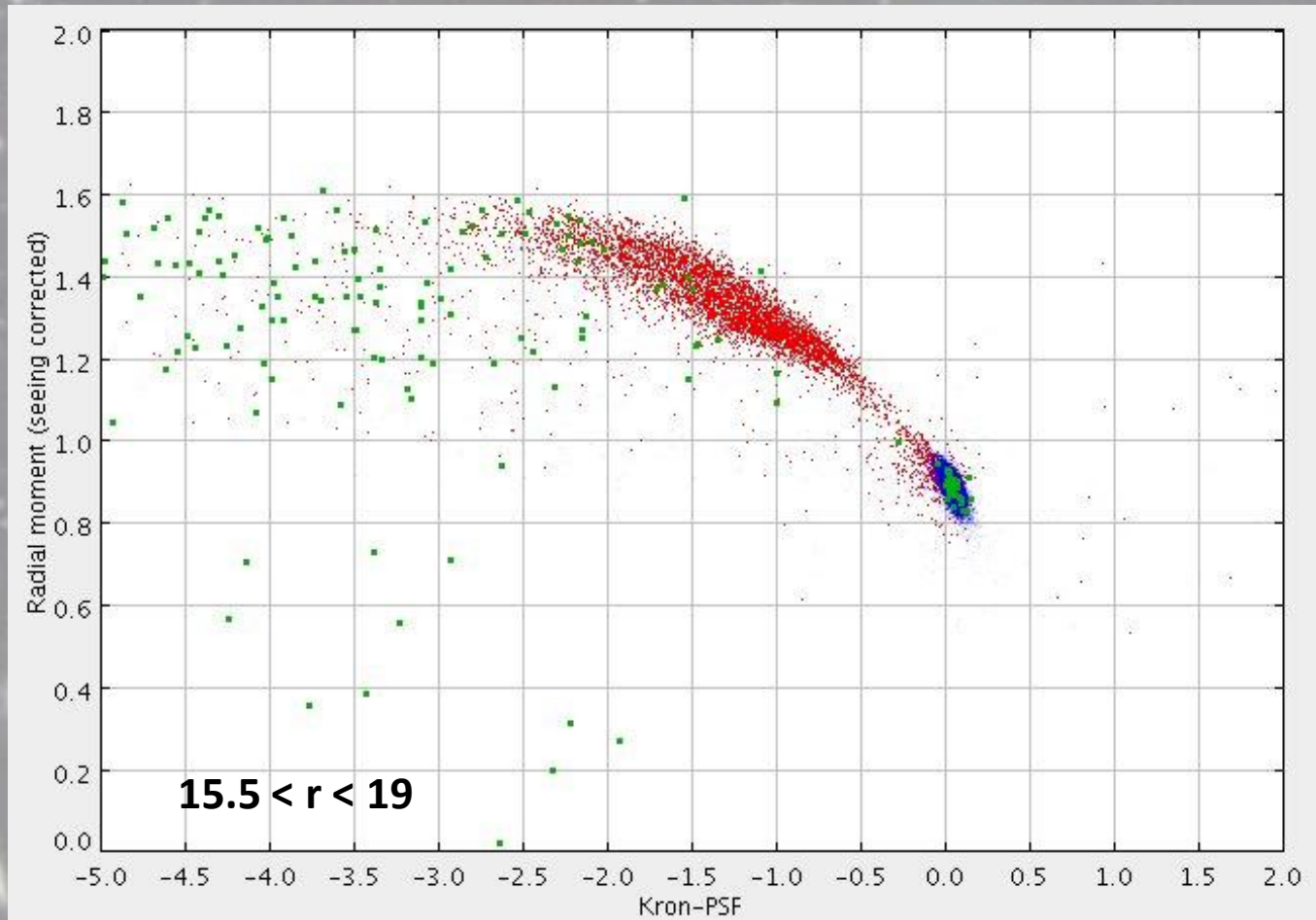
Kron-PSF v half light radius



Kron-PSF v half light radius



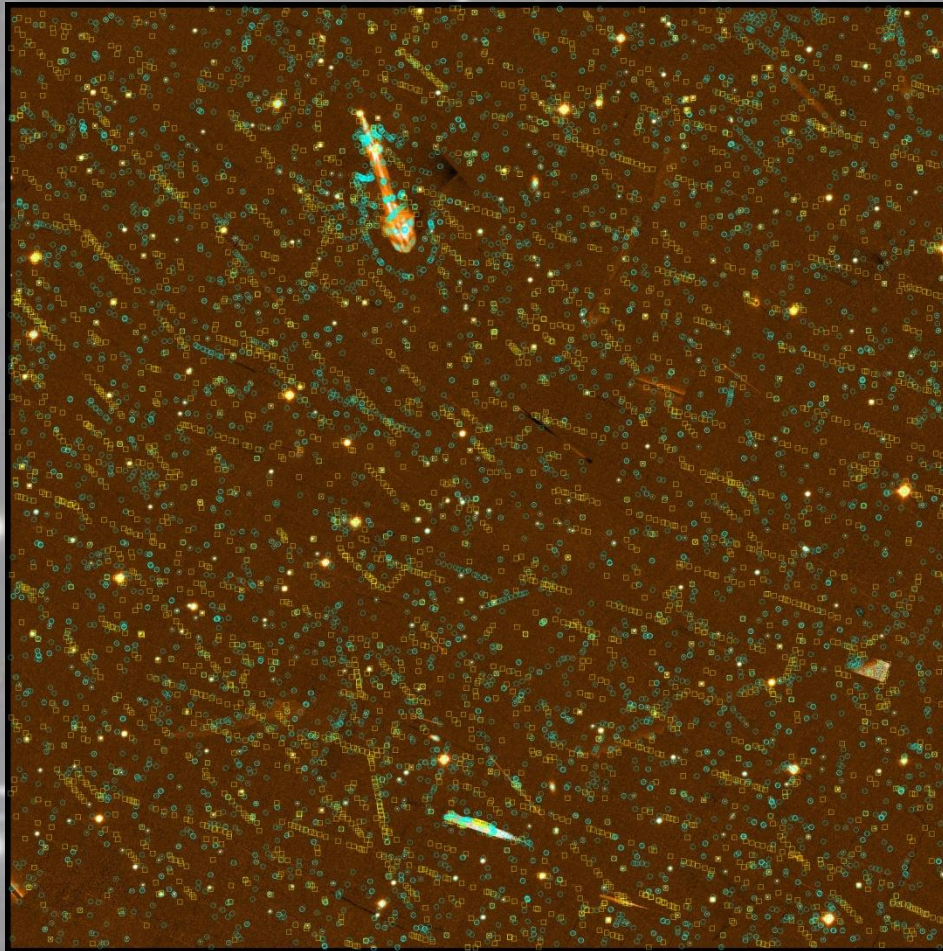
Kron-PSF v half light radius



Should be possible to devise a cut to remove some false detections

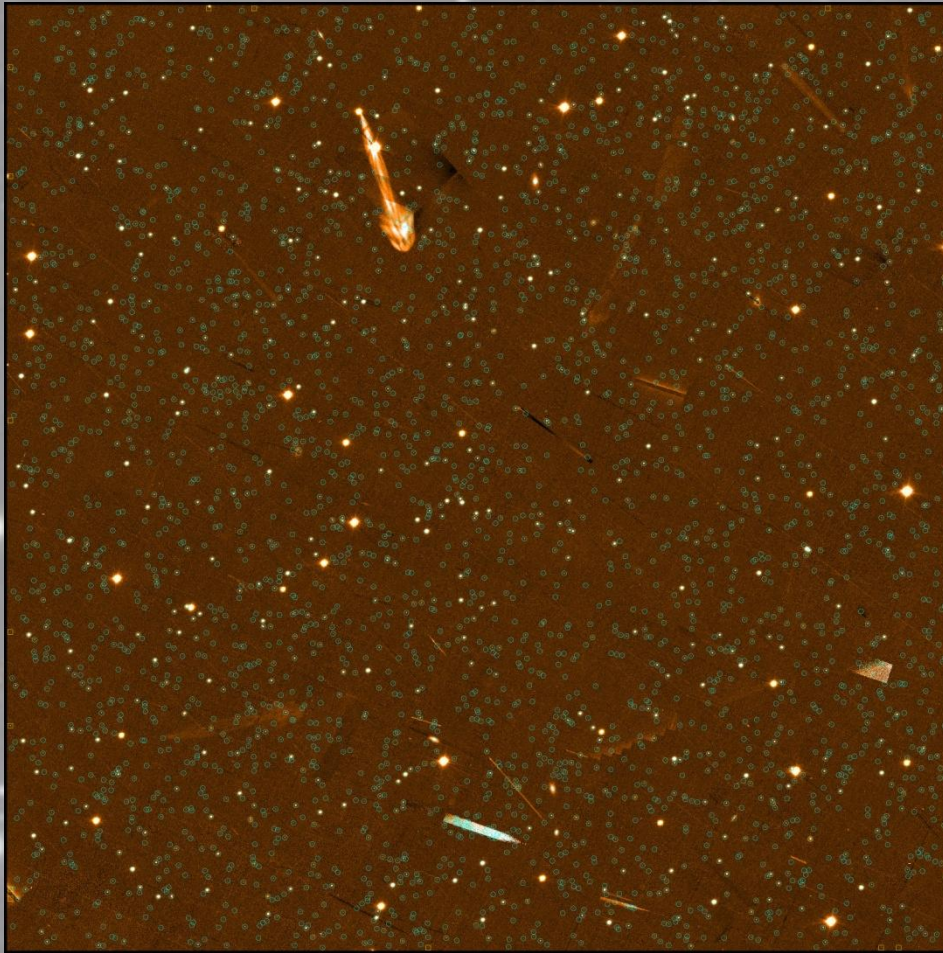
Warp detections

(Yellow removed by FLAG cuts)



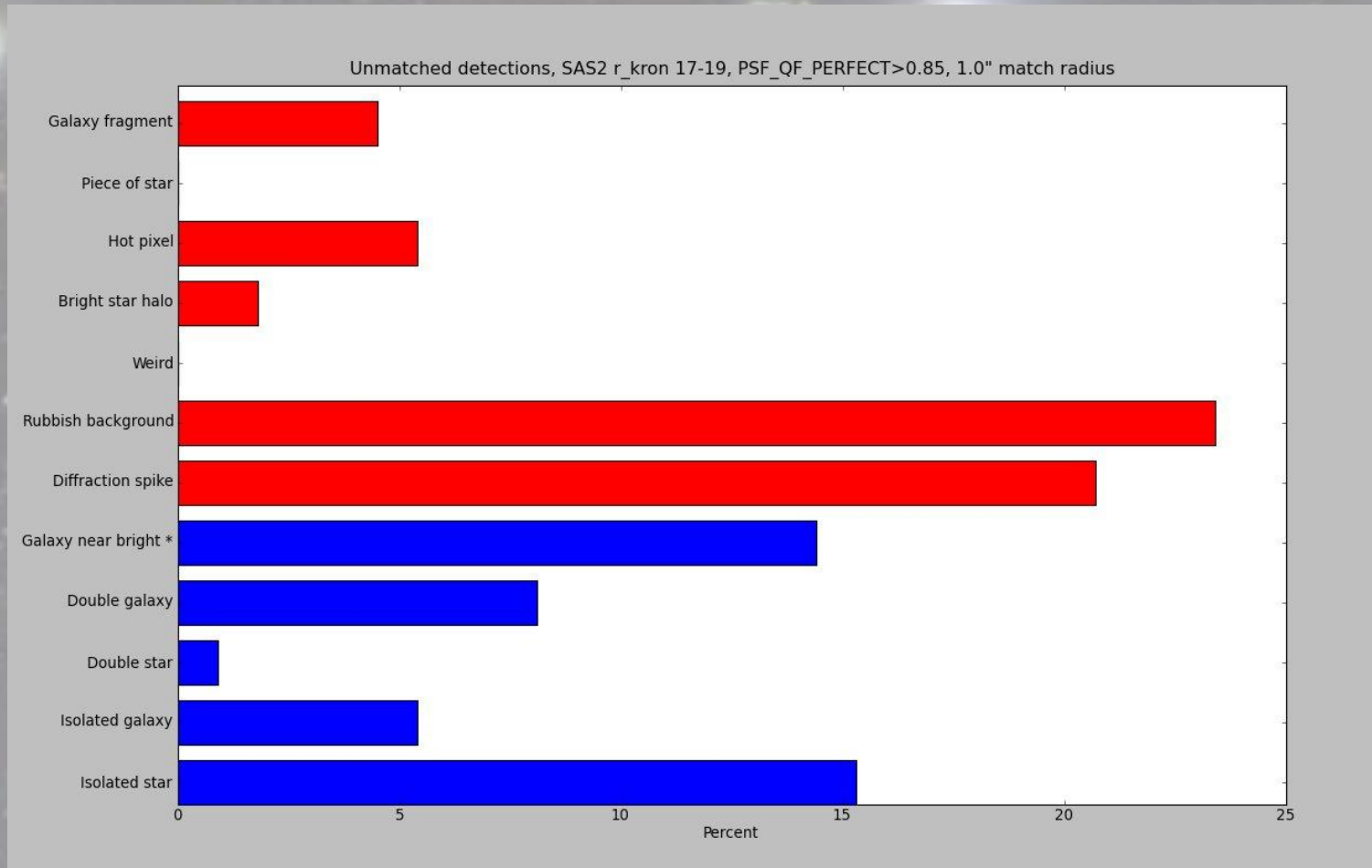
Stack detections

Image in both cases is the *mean* of the input warps



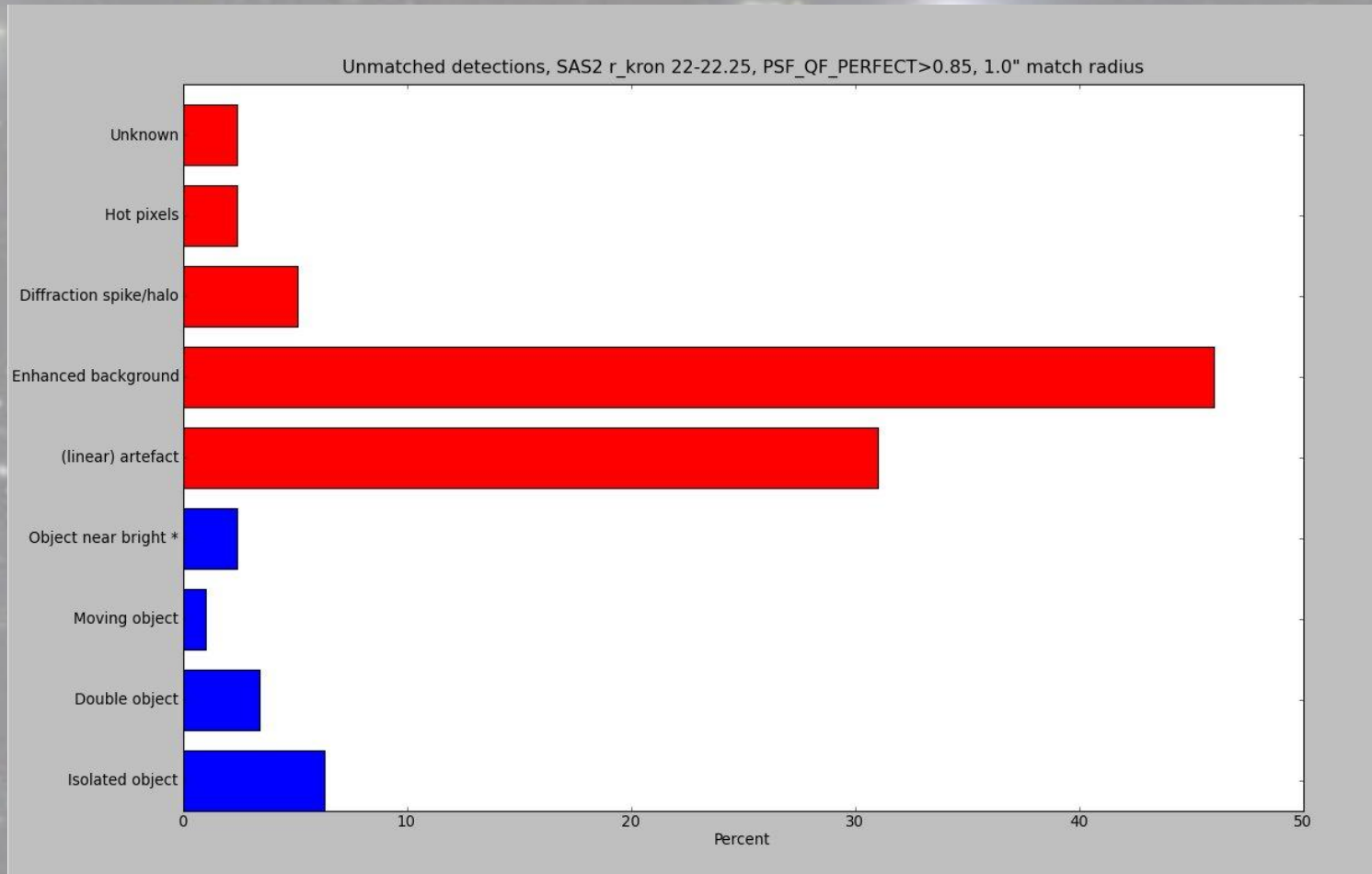
False detections

$17 < r < 19$ (~9% removed by BAD flags)



False detections

$22 < r < 22.5$ (~5% removed by BAD flags)



SAS2 galaxy & Star counts

Green: SDSS DR8 galaxies; Blue: PS1 stars; Red: PS1 galaxies (solid – full area)

Notes:

- Using empirical Kron-PSF v half light to separate and remove false detections.
- DR8 slightly higher – but may be junk in DR8!
- Both below full SDSS (Yasuda et al).
- No extinction corrections applied – about 0.2 mag.
- Full SAS2 (90 sq deg) agrees well with calibration area (16 sq deg).

