Galaxy Clustering with Pan-STARRS1

Daniel Farrow
With Shaun Cole, Nigel Metcalfe, Peter Draper, Peder Norberg & the PS1 team

Outline

- What is Pan-STARRS1?
- Status of Pan-STARRS1.
- Sample selection, masks, star galaxy separation.
- Early galaxy clustering results

Pan-STARRS1

- 1.8m on Haleakala, Maui. Built & run by the University of Hawaii.
- 5 optical/NIR bands (roughly SDSS griz + y)
- Large area survey - '3 pi' – ideal for ISW
- Smaller deeper fields - 'Medium Deeps'.
- PS1 Surveys completed October 2013

Photo by Rob Ratkowski © 2010 PS1SC.

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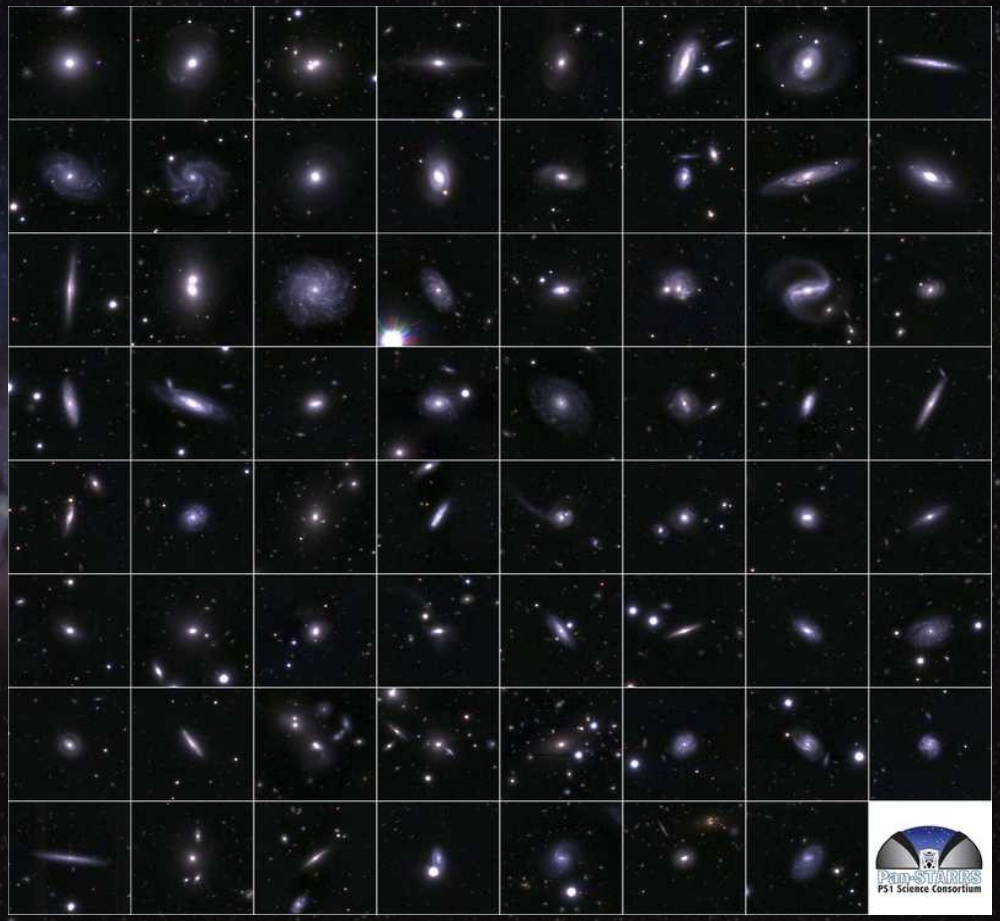
Pan-STARRS1



(Background is a zoom of this image)

Credits: Eugine Magnier (UH IfA), Peter Draper & Nigel Metcalfe (Durham University), ©PS1 Consortium

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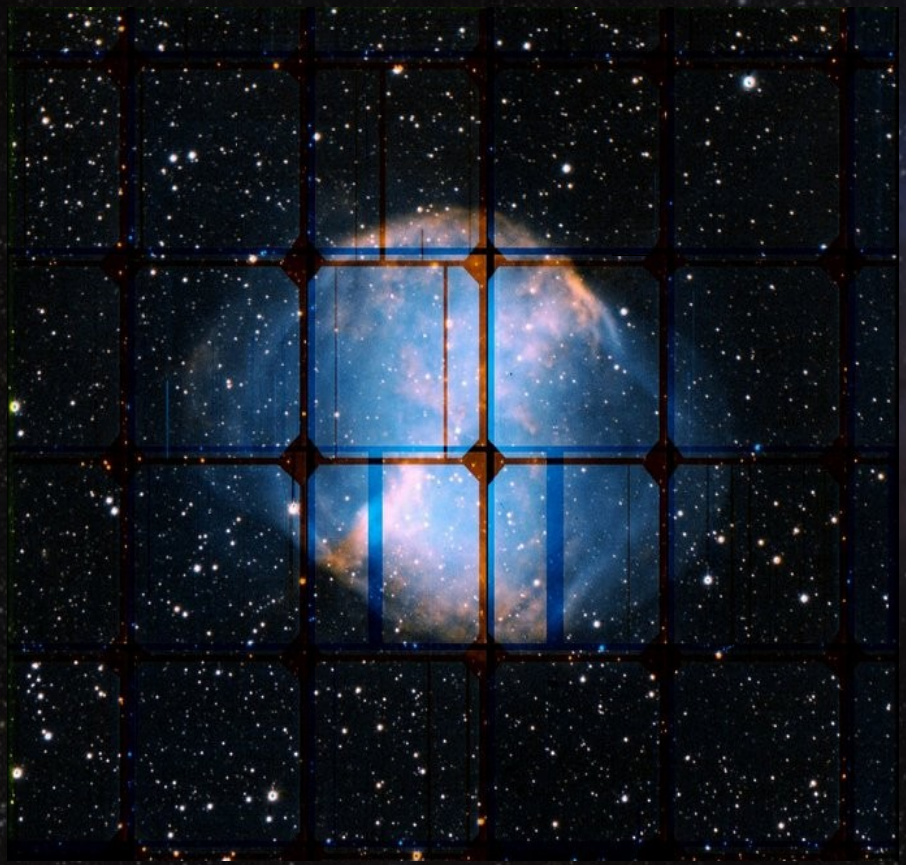
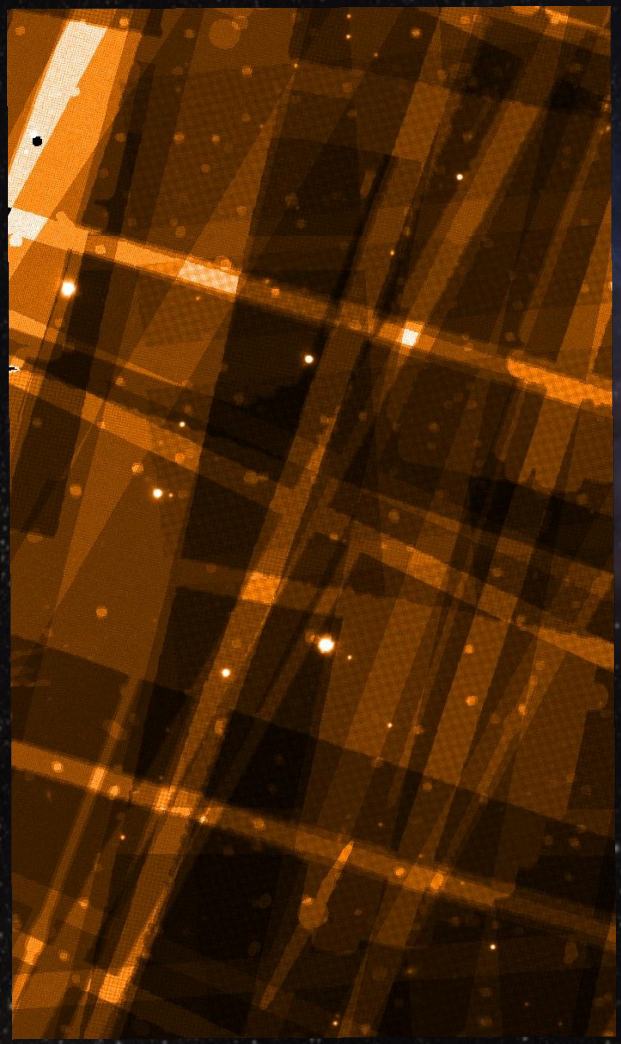
Observing Strategy

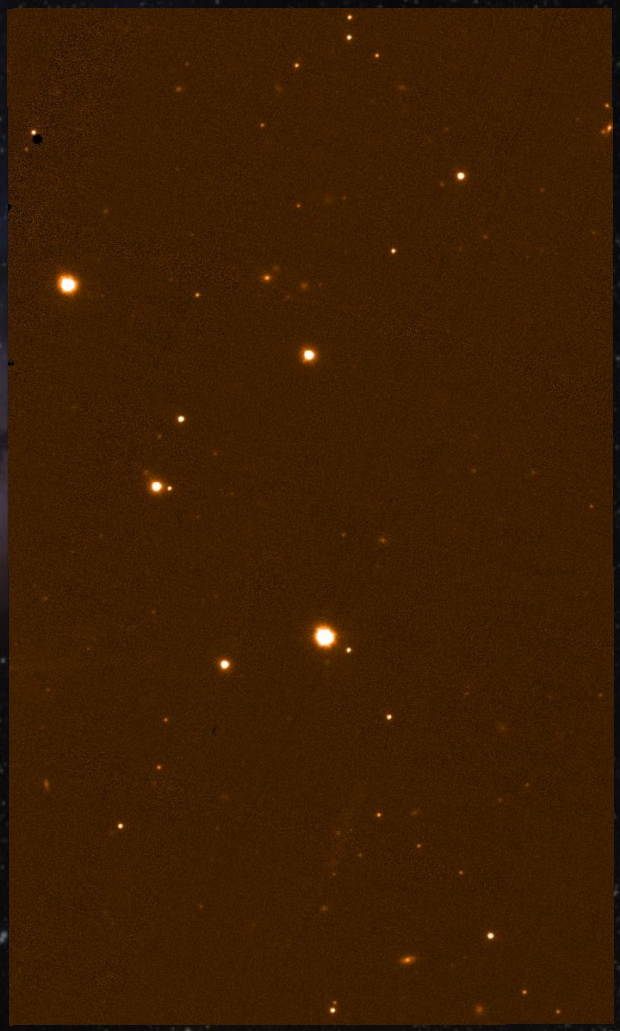


Stack images (in the same band or different bands) with different rotations & different centres to form the final image

Image Credit: Nigel Metcalfe (Durham)

Variance Map





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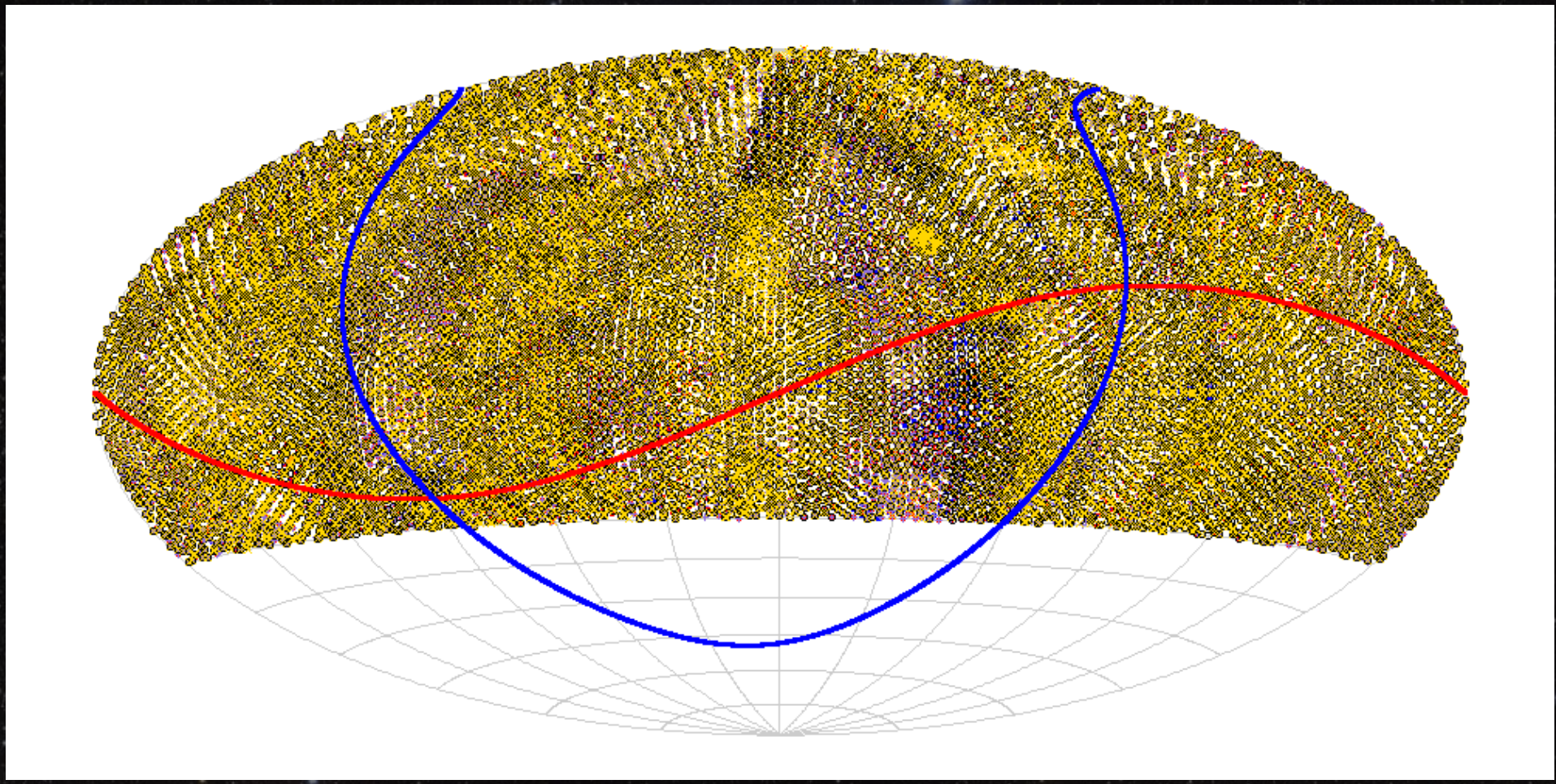
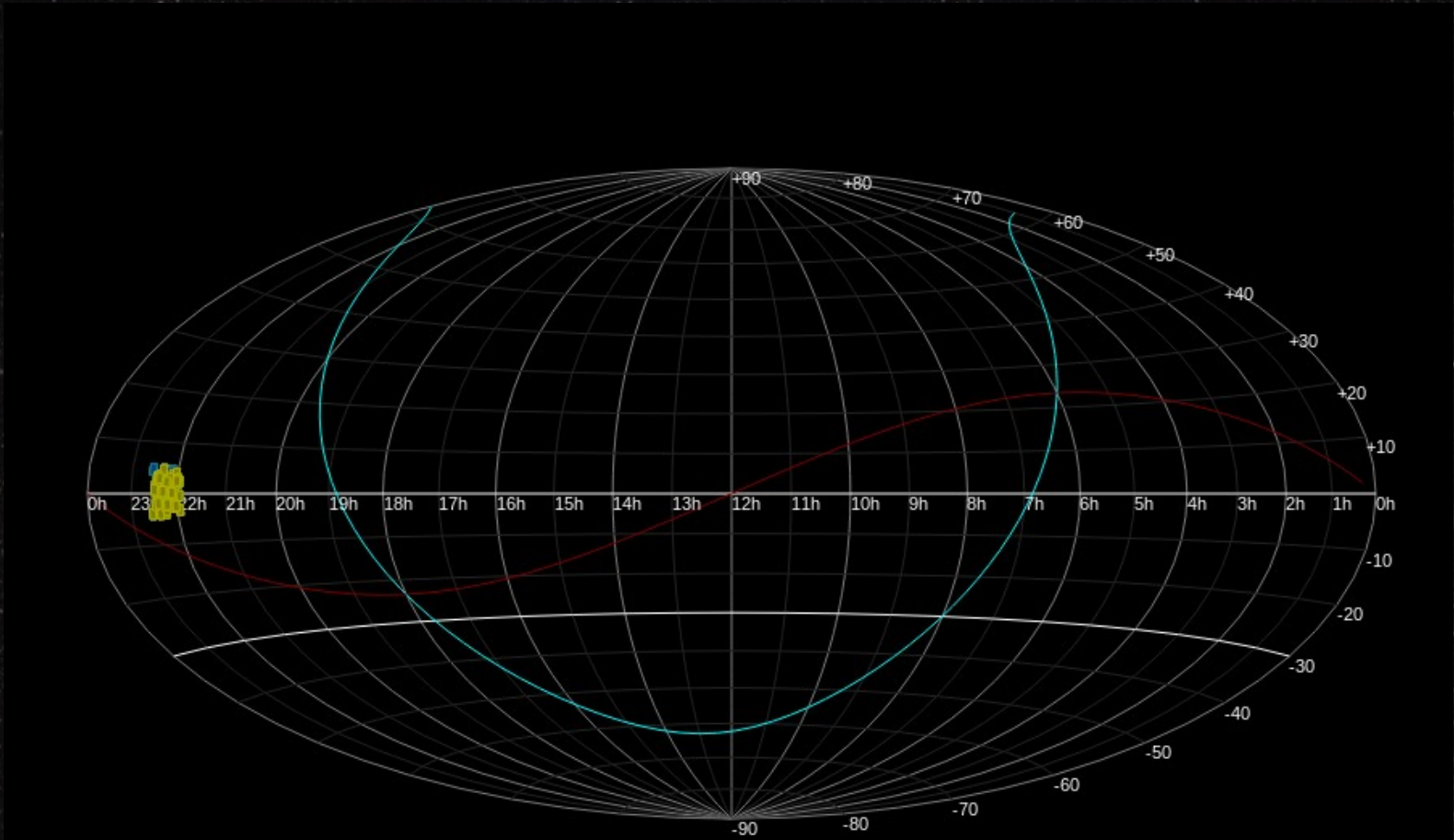
Pan-STARRS1 Status

Large area – good for ISW in photo-z slices:



Credit: Ken Chambers (UH IfA)

Pan-STARRS1 – Small Area Survey 2



Credit: Ken Chambers (UH IfA)

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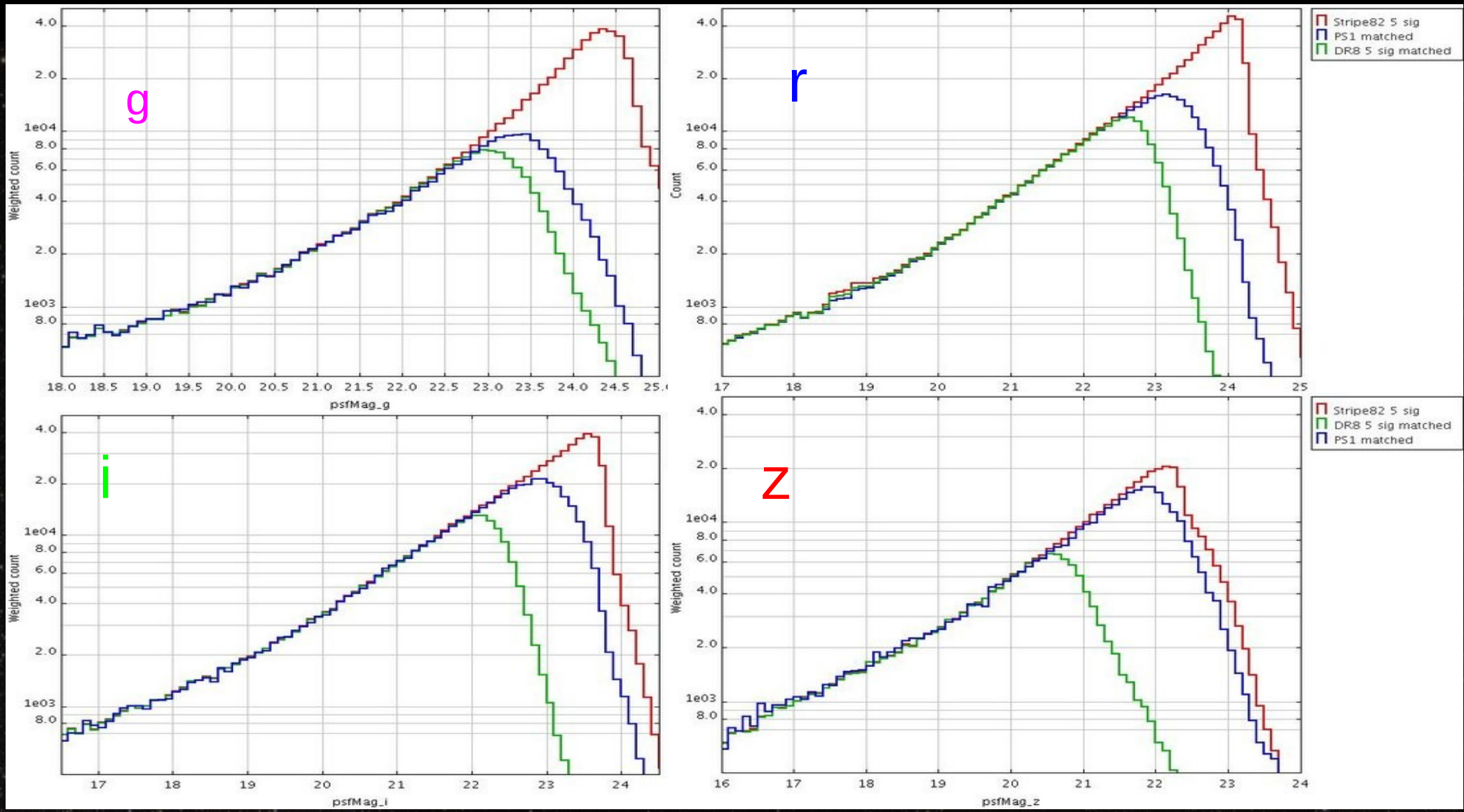
Depth



Credit: Nigel Metcalfe

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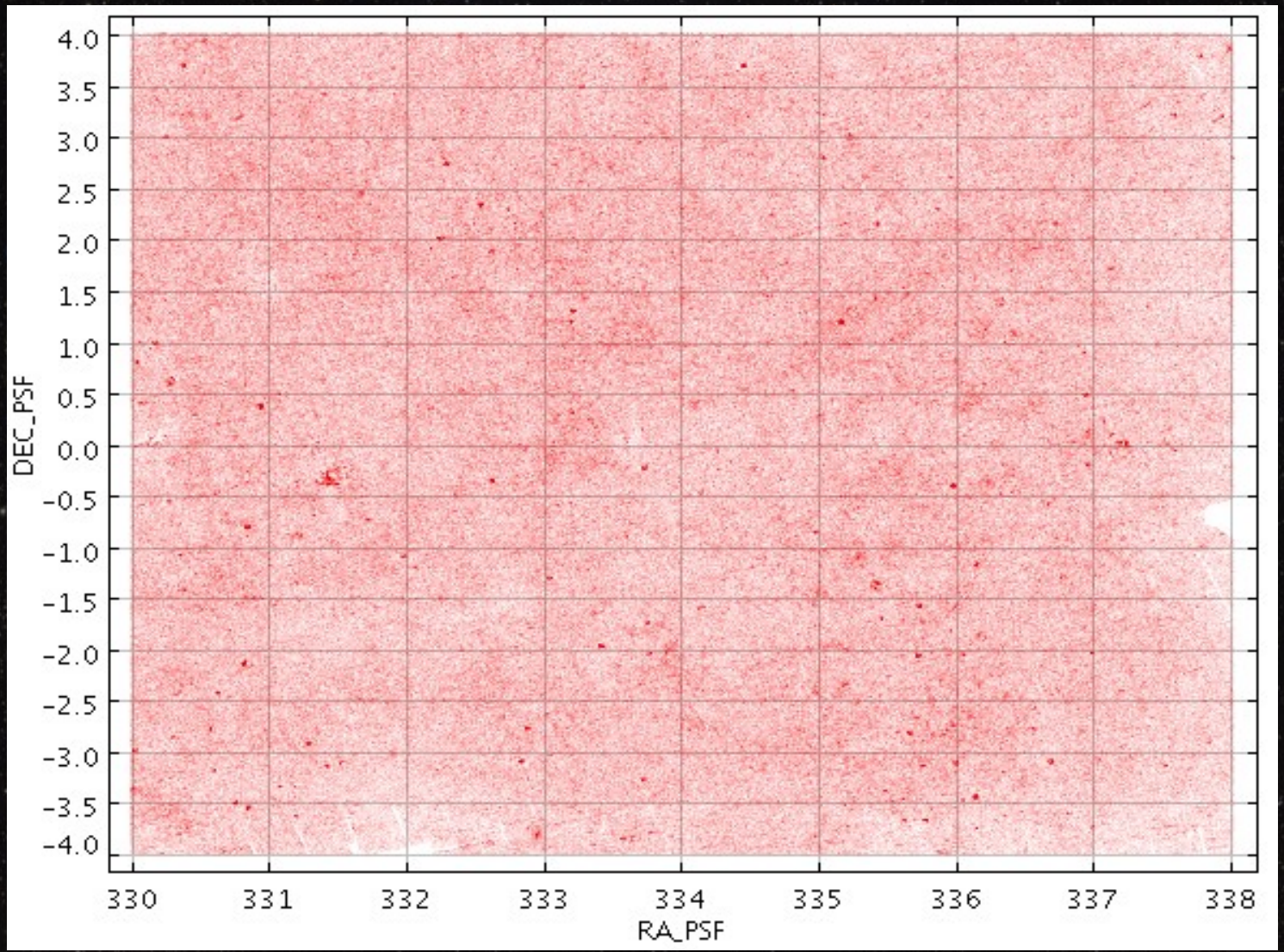
Sources



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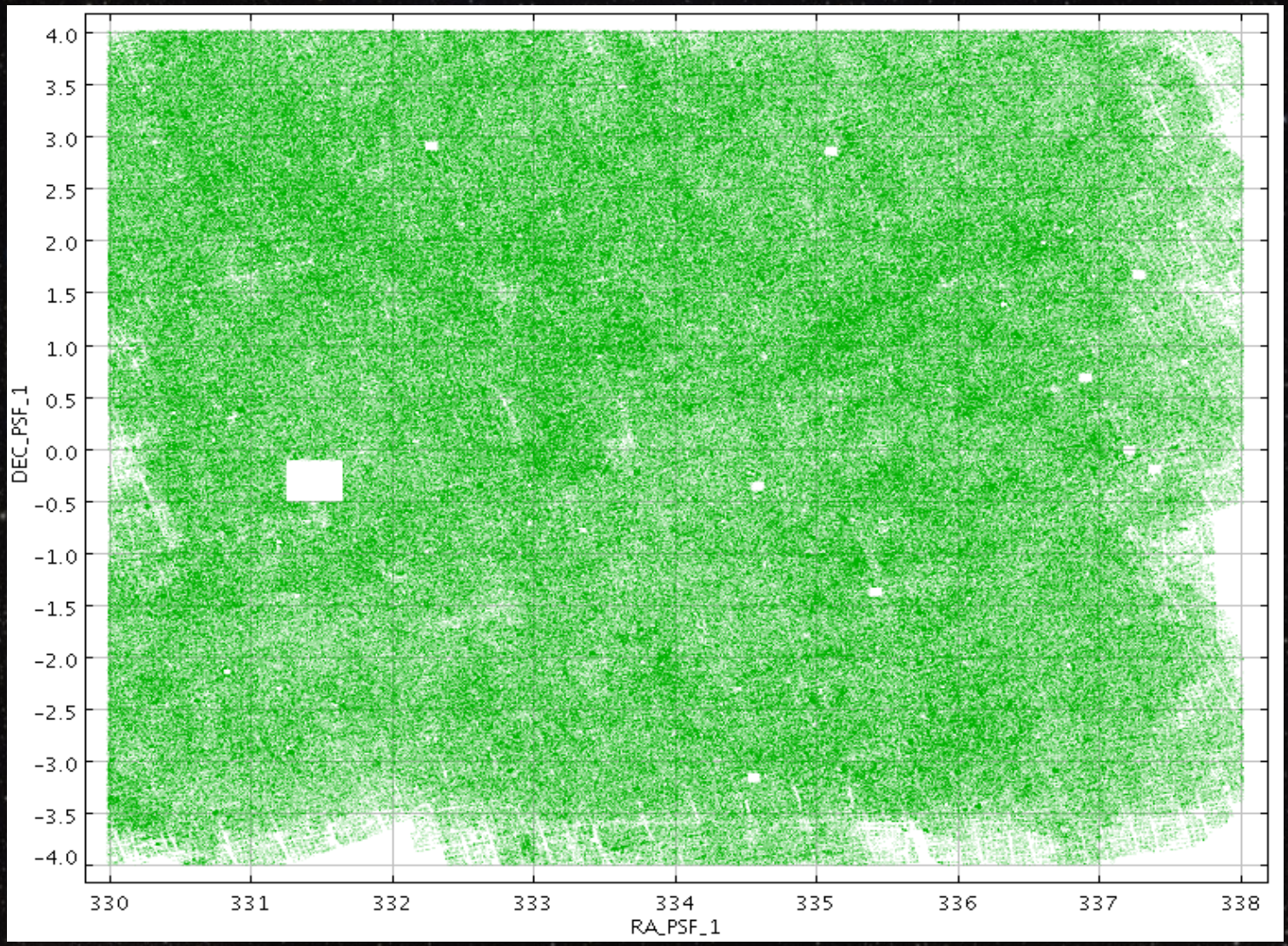
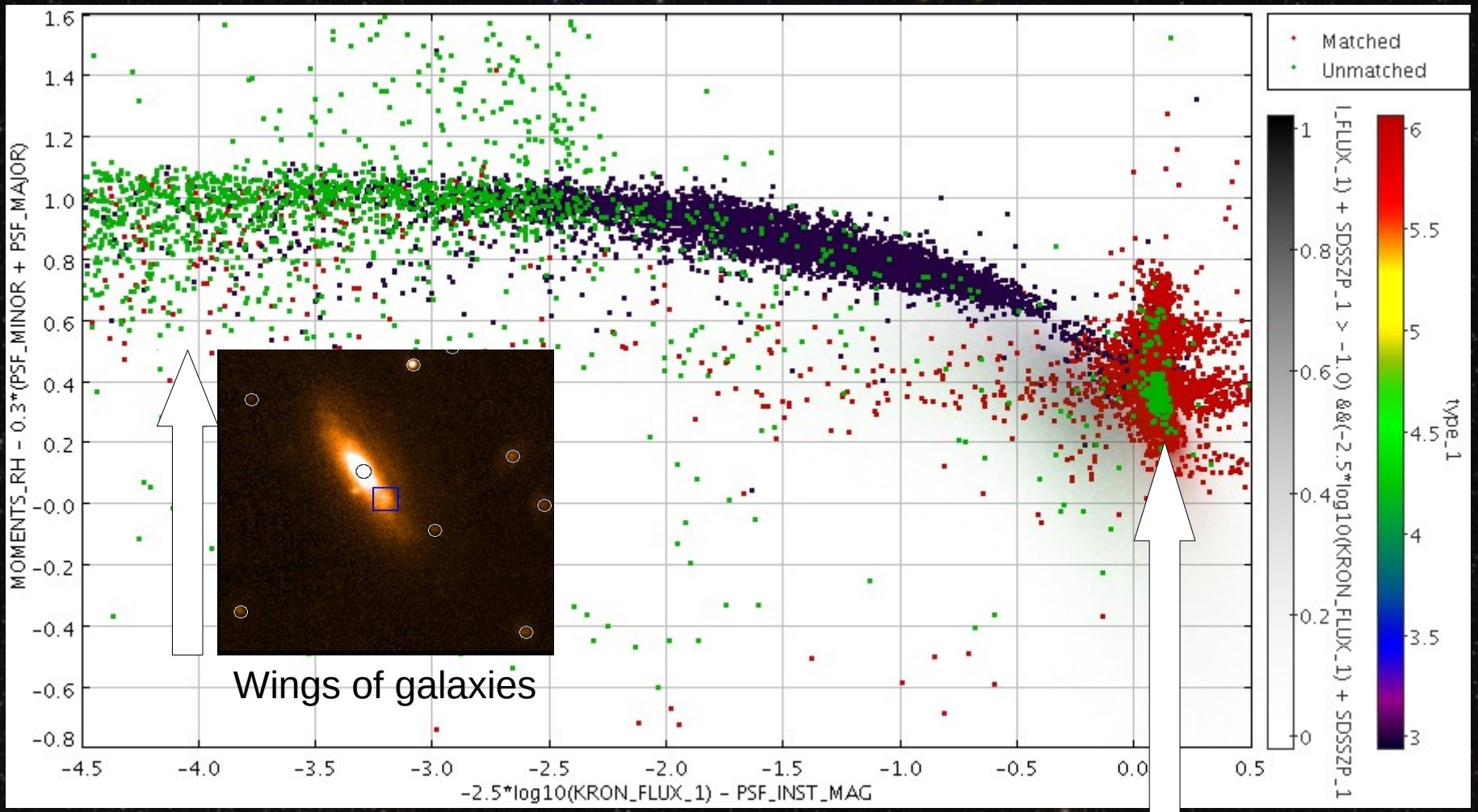
Sources in our Mask



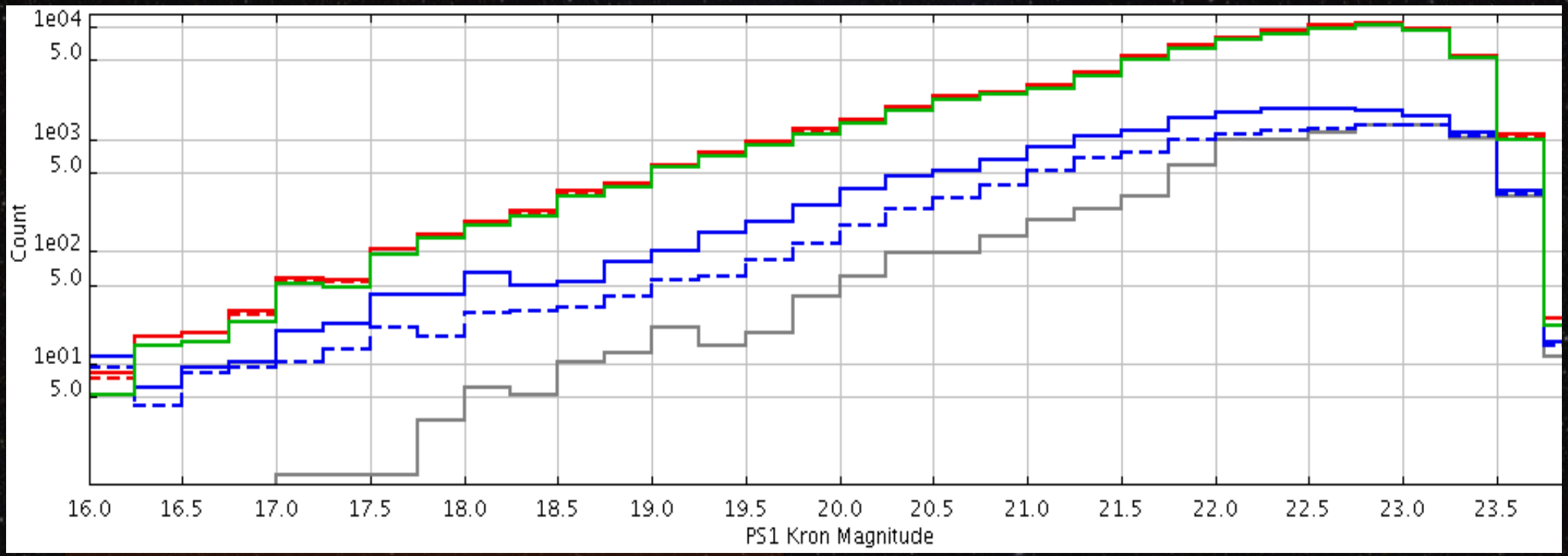
Star/Galaxy Separation



r<18

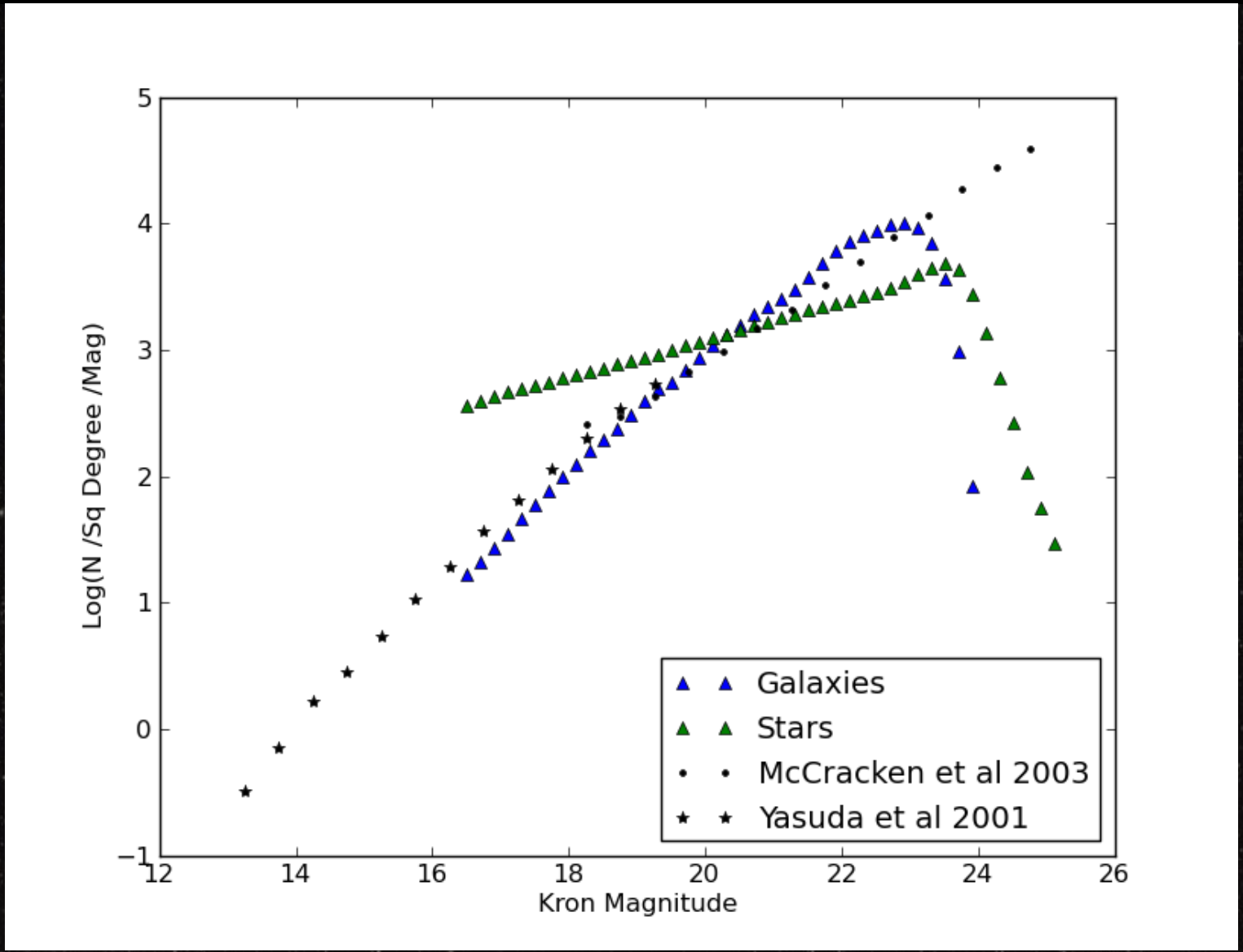
Real objects in DR8 mask

False Positives Rate



Red – Matched Galaxies
Red Dashed – Basic deblending
Blue – Umatched Galaxies
Blue Dashed – Basic deblending
Grey – Unmatched with 2D cuts is s/g plot
Green – Matched with 2D cuts in s/g plot

Number Counts



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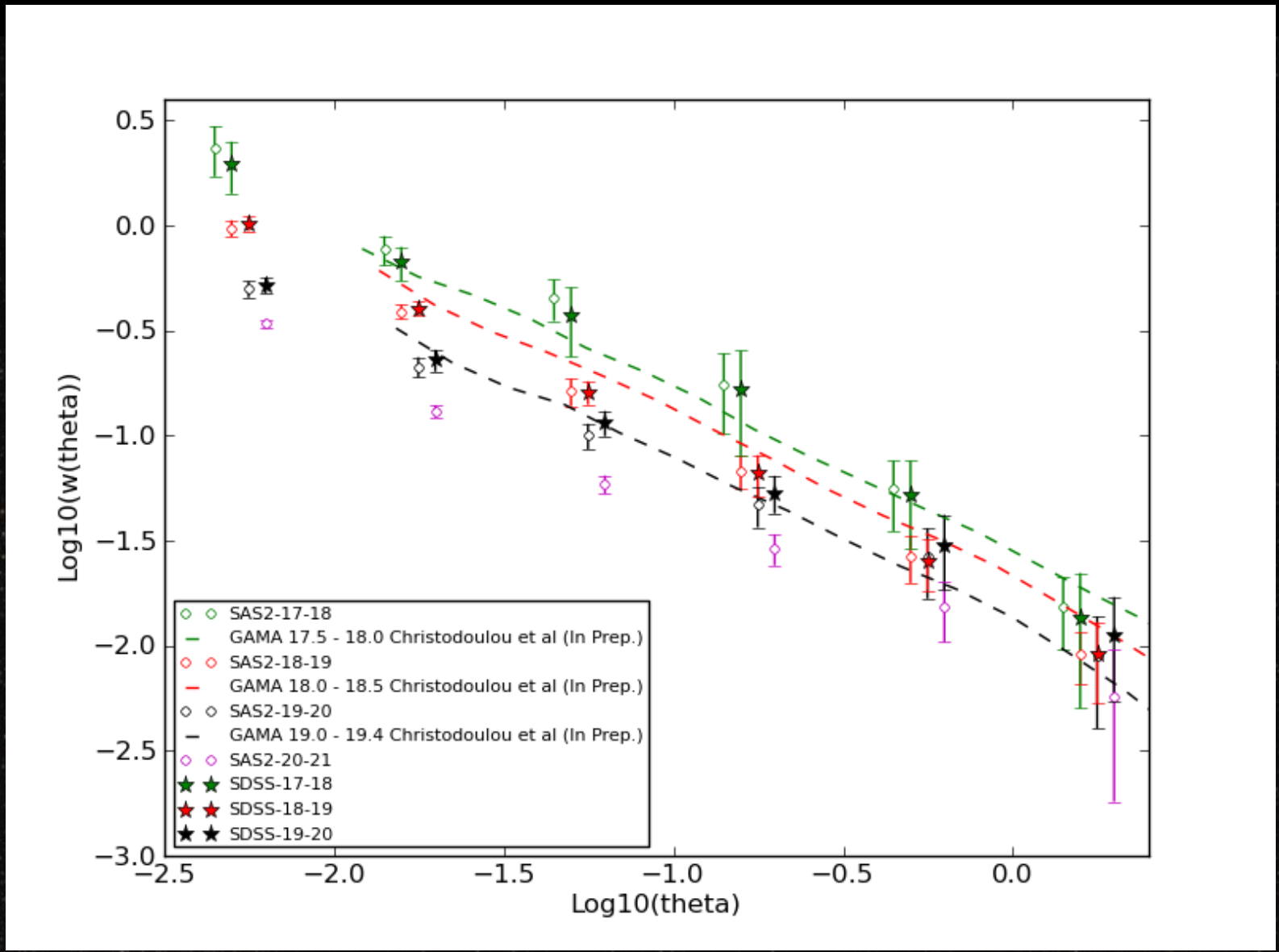
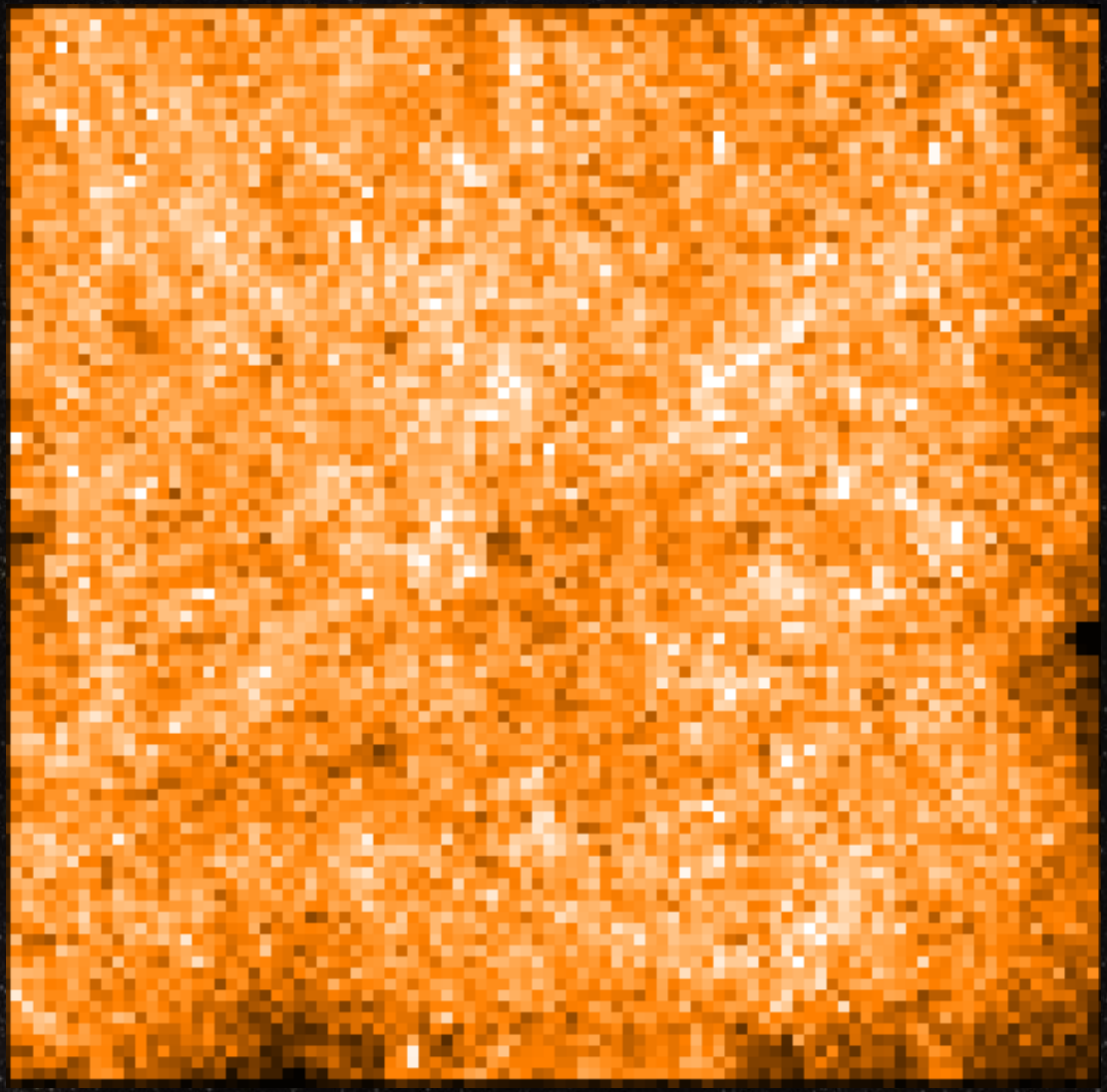
Clustering Results



Variance Maps vs. Detections



22<mag<23

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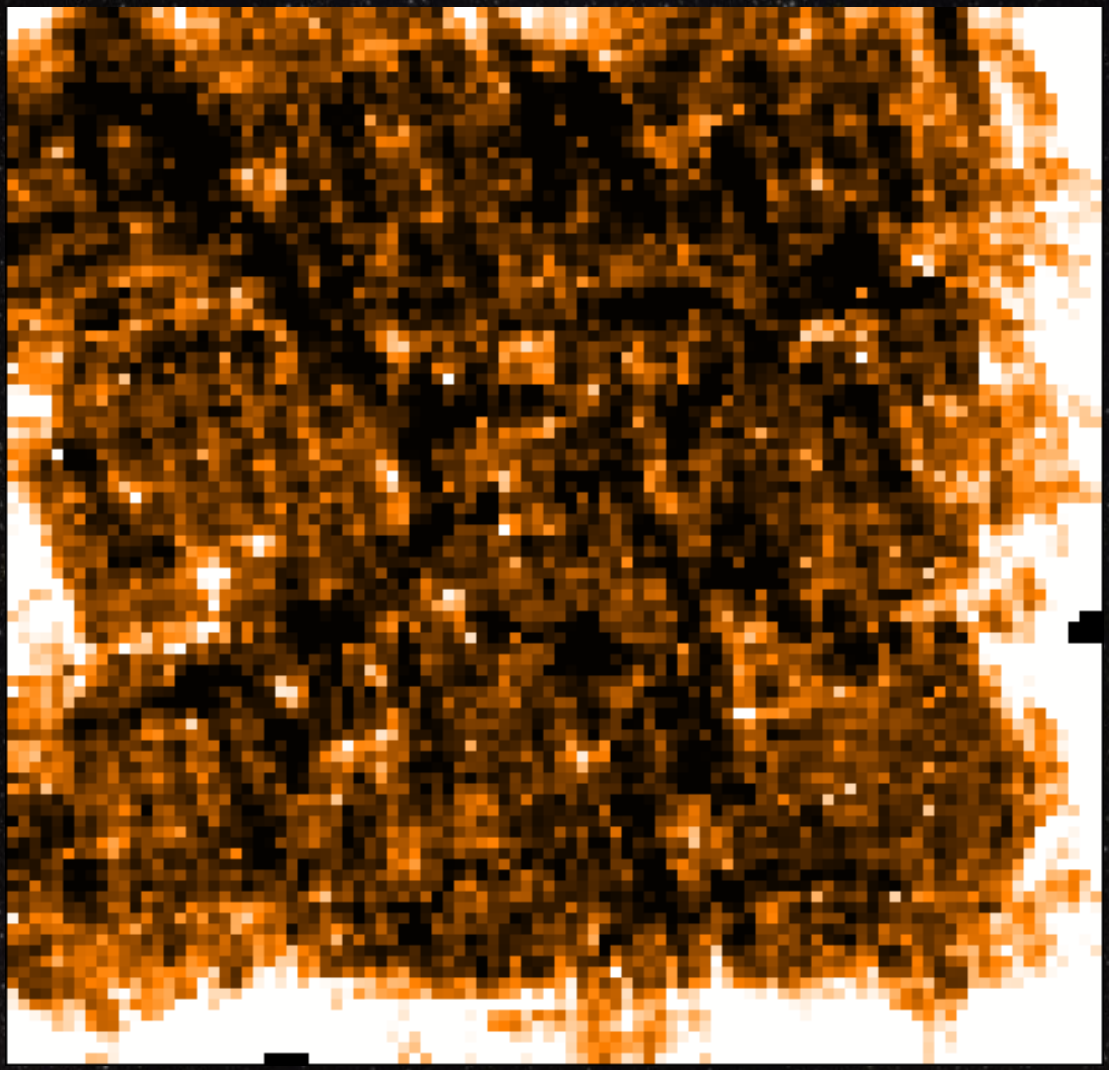
Variance Maps Vs. Detections



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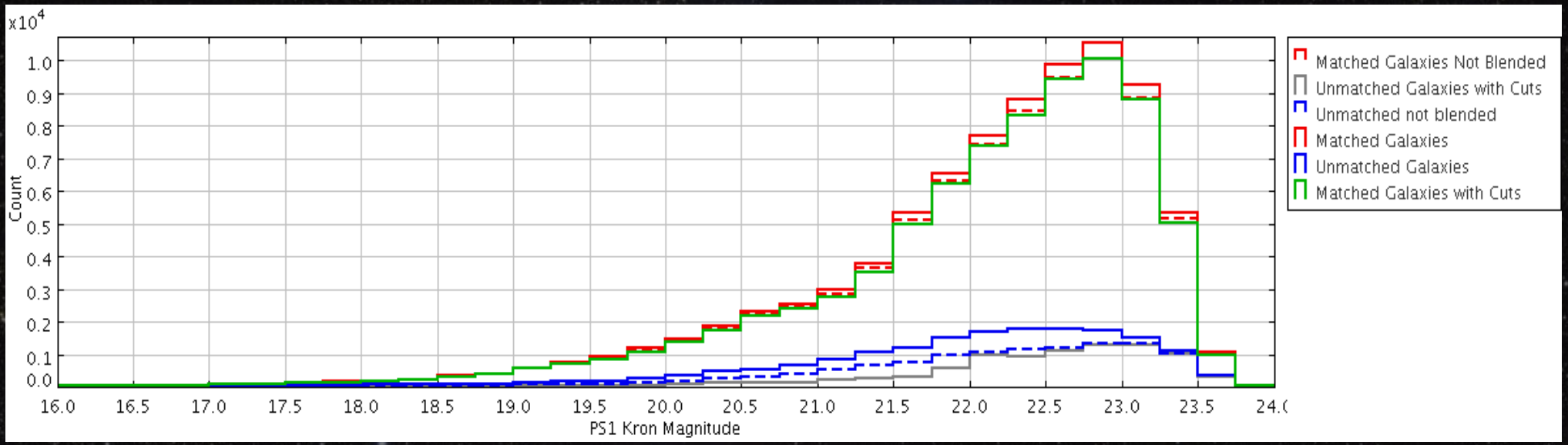
Conclusions

- Pan-STARRS is on track to deliver 5 band photometry over most of the sky
- We've developed star/galaxy separation & masks
- We've measured angular clustering
- Need to add detection efficiency effects to the randoms
- Scale our work to the whole 3 pi



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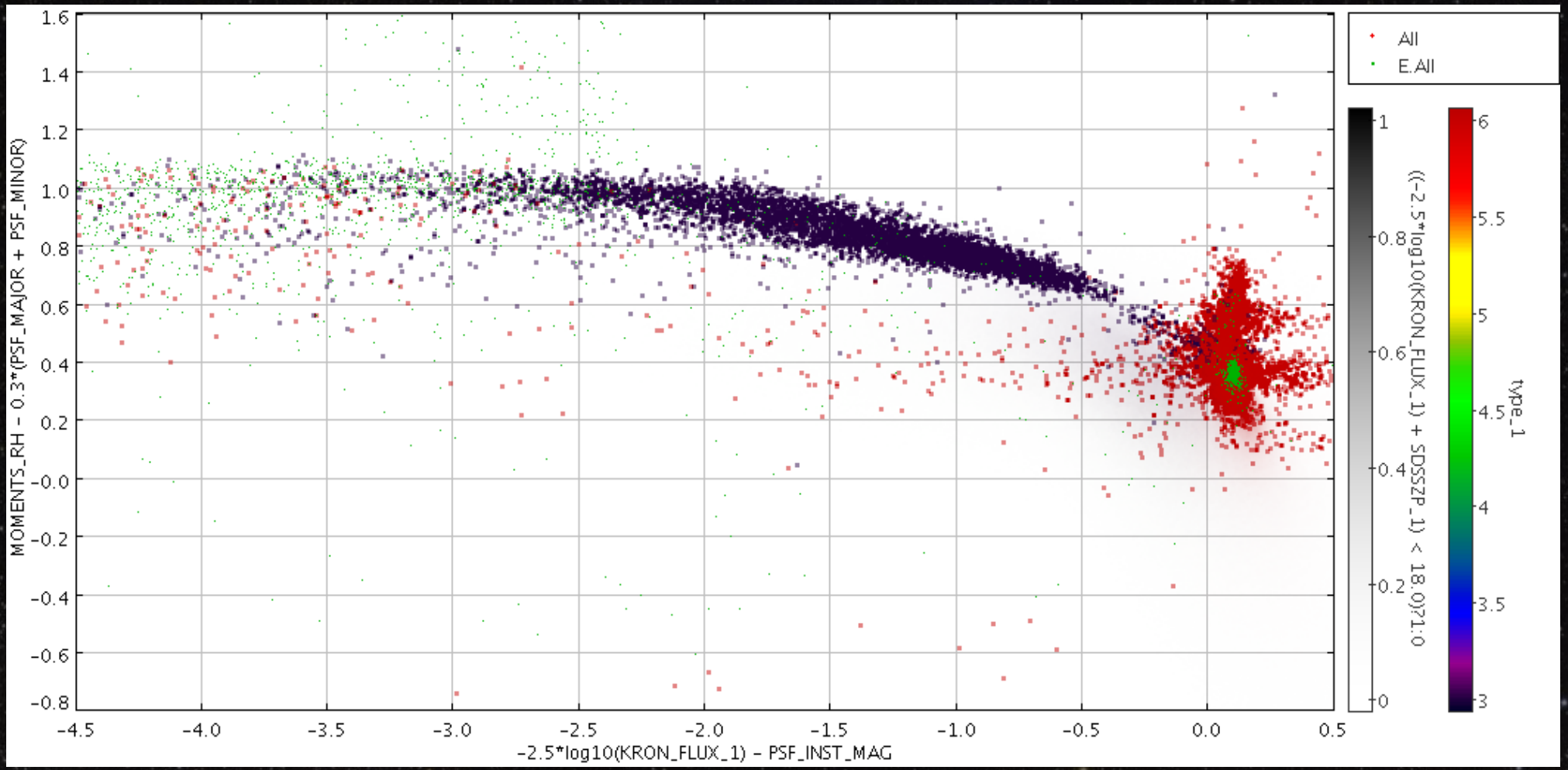

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