Parallel session 2- Imaging systematics and LSS catalogues

1 Imaging systematics

Potential systematics that affect the LSS data catalogue at the imaging stage include

- Image survey depth.
- Bright objects that occult source images.
- Variations in seeing.
- Variation in stellar density across the survey causing varying source extraction efficiency.
- Variations in airmass
- Extinction (we don't need a correction term but must try and understand the error in our knowledge of this).
- Tractor code efficiency.
- De-blending of overlapping images.

2 Possible approaches to account for these effects

To remove these effects from our catalogues we could forward model the random catalogue to include these effects or alternatively use a backward BOSS type modelling of the random catalogue. These two methods are briefly outlined here.

2.1 Forward modelling the random catalogue

- Inject fake sources into the images and run them through the tractor code.
  - Is this feasible for the number of random objects?
  - Maybe so if we already know the location of the objects (this may bias the outcome so add in some uncertainty on position).
  - Keep fake sources that pass target selection. Can be used with forced n(z), by changing ra,dec between trials of given fake source.
- Alternatively make a plot of probability of detection in each band vs S:N, seeing, airmass, stellar density etc. So choose ra, dec find the seeing, S:N etc and from these quantities look up the probability of detection. Is John Moustakis already doing this? -What is the minimum number of variables required to completely define the detection efficiency?
- The forwards method is good at removing the effects of non-target sources, thus eliminating the need for veto masks.
- One issue is making a sufficiently complete sample of fake sources, options: HST data, or stacking of observed targets?

2.2 Backwards modelling randoms

- Begin by creating a statistically isotropic catalogue within survey area with none of the above effects accounted for.
- Cross correlate the sample with the above list of effects.
- Look for correlations with the data and the non-cosmological effects and try and understand the dependencies.
- Model the effects and try and remove them by weighting the data or randoms.
- This will be difficult as in DESI the effects are not purely angular or radial but a function of both.

3 Conclusion

It would be beneficial to include the effects of the imaging using both of these methods and then cross check that they give the same answers.