

Signal Contamination of Alpha Maps

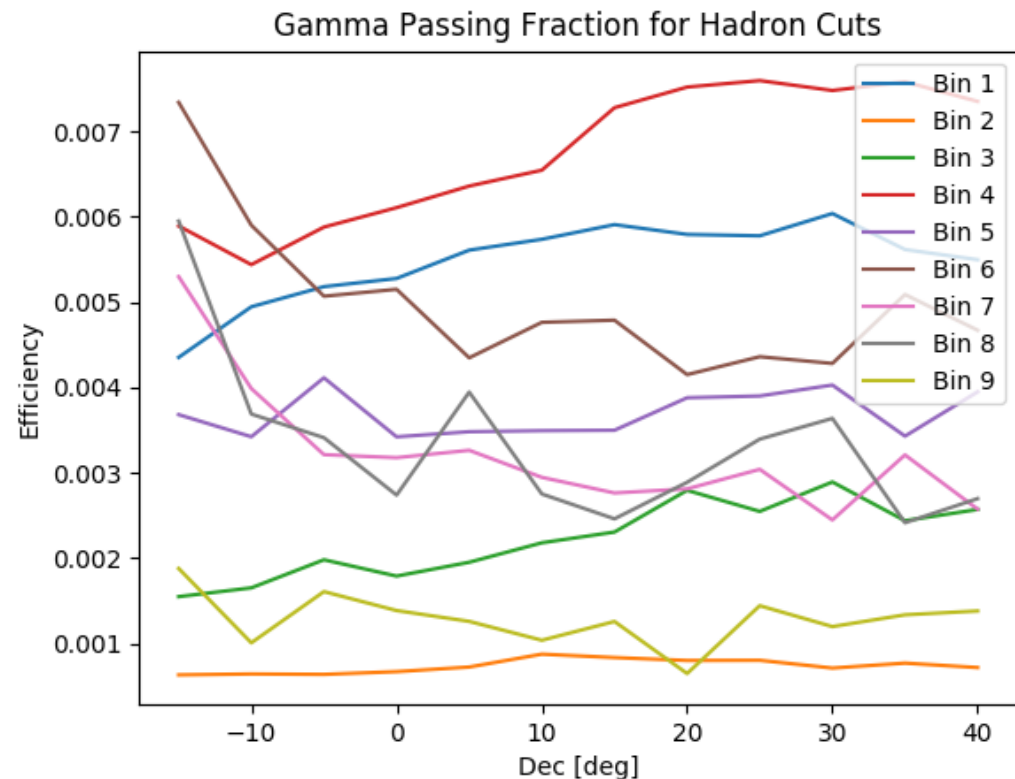
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Background

- Galactic Halo dark matter is highly extended
- When using direct integration, this leads to an expected signal contribution to the background, even in the “off regions
- Accounted for this with effective J-factor
 - Penalized expected flux by percentage based on running J-factor maps through DI
- Tested if we need to do something similar for alpha maps
 - No “on” and “off” regions, so not as straightforward
- Look at both gamma-passing and hadron-passing maps

Hadron Maps

- Check how much contamination we can expect in the hadron maps
- First, need to look at gamma-efficiency of the hadron cuts
 - They were chosen to be “harsher” so few gammas should pass
 - Used gamma MC to check the gamma content as a function of declination and fhit bin
- As expected, very few gammas pass even at high zenith
- Probably negligible



Gamma Maps

- Pooja found that strong localized sources (I.e, Galactic Plane) bias the background
- Test if adding a Galactic DM Halo to the gamma maps effects the background
 - If so, will need to account for this somehow when doing limits
- Chose 100 TeV, bb spectrum with cross section set to $1e-23$
 - Covers most of energy range
 - Chose fairly high cross-section to guarantee the contamination isn't underestimated
- Then, re-computed alpha background using injected gamma maps and compared with the true data case (in each bin)

Results

- Huge differences in background
 - Around 10% for bin 1
 - Over 400% for bin 9
- Something doesn't seem right here
 - Tried for cross section of $1e-26$
 - Only finished for bin 1, but got the same results
 - Injection looks like it was bugged
- Will try to figure out what's going on here