Status report

Oliver Reardon-Smith

University of Bristol

or1426@my.bristol.ac.uk

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All our plots were made using the same 4500 events with:

- $1500Z \rightarrow b\bar{b}$
- $1500Z \rightarrow c\bar{c}$
- $500Z \rightarrow u\bar{u}$
- $500Z \rightarrow d\bar{d}$
- $500Z \rightarrow s\bar{s}$

Taken from the Stanford FTP server

We made the following changes to the detector geometry:

- Removed some non-sensitive "dead" material from the end of the vertex barrel
- Doubled the length of the outer four vertex barrels
- Moved the vertex barrel endcaps back so they didn't intersect the barrels

We were interested in comparing the tracking abilities of our modified detector with sidloi3

Firstly we look at "lego plots" showing the frequency distribution of points in the reco parameter - mc parameter plane.

D_0 MC / reco comparison

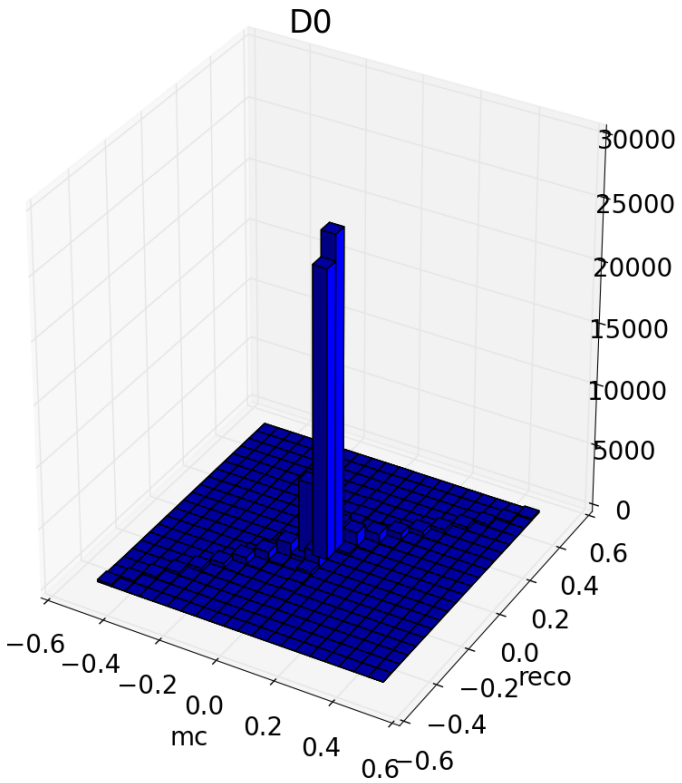


Figure: sidloi3

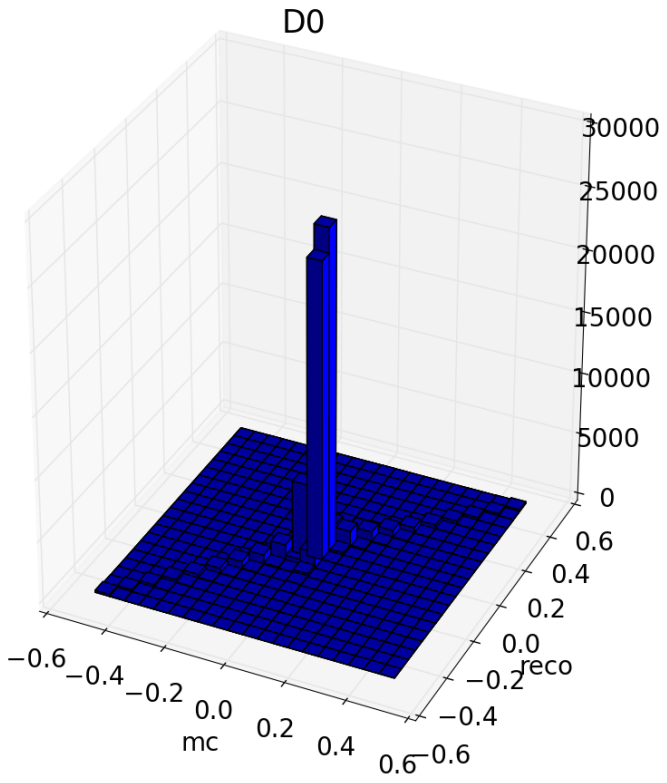


Figure: modified

ϕ_0 MC / reco comparison

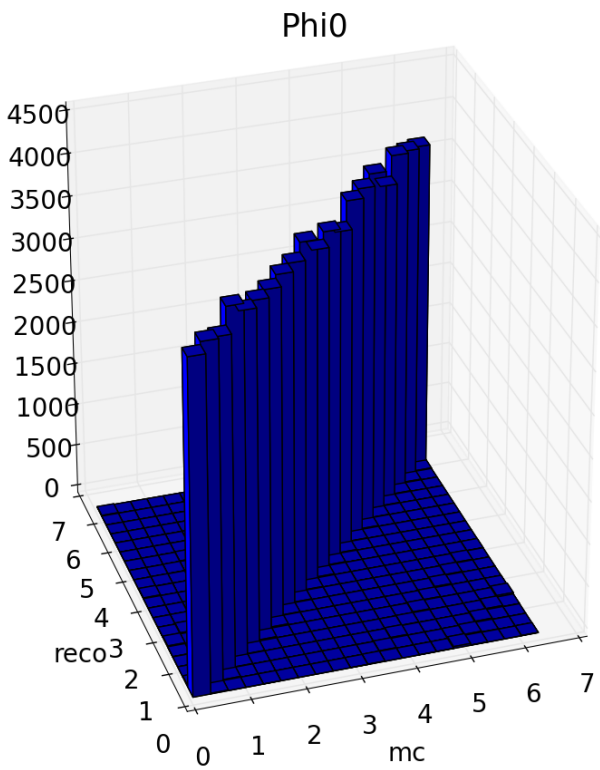


Figure: sidloi3

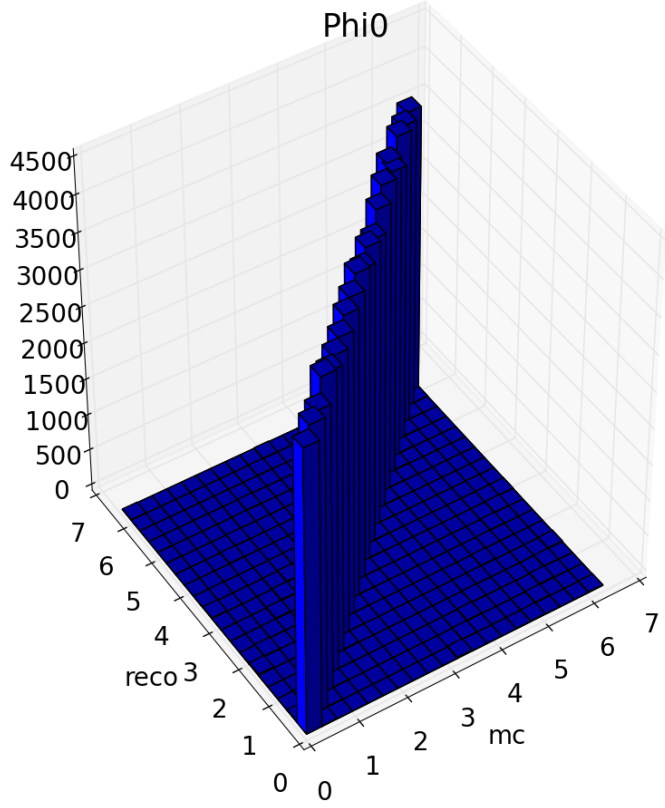


Figure: modified

ω MC / reco comparison

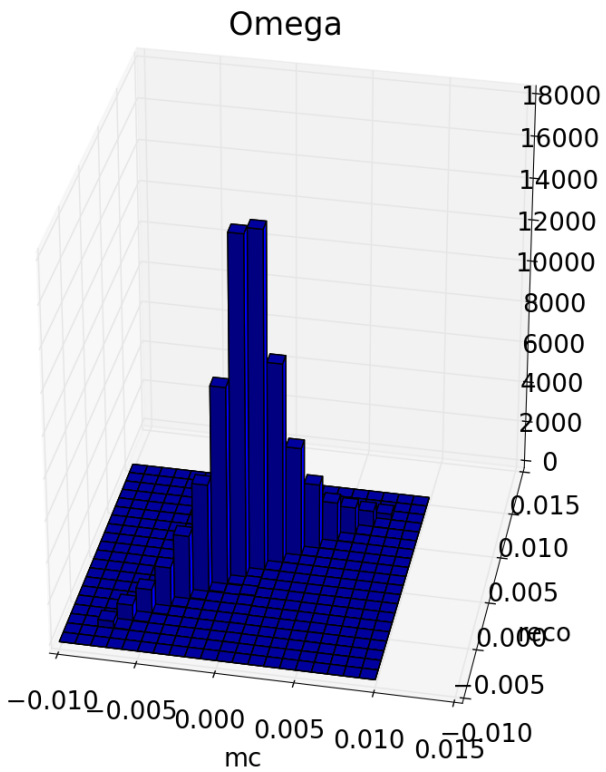


Figure: sidloi3

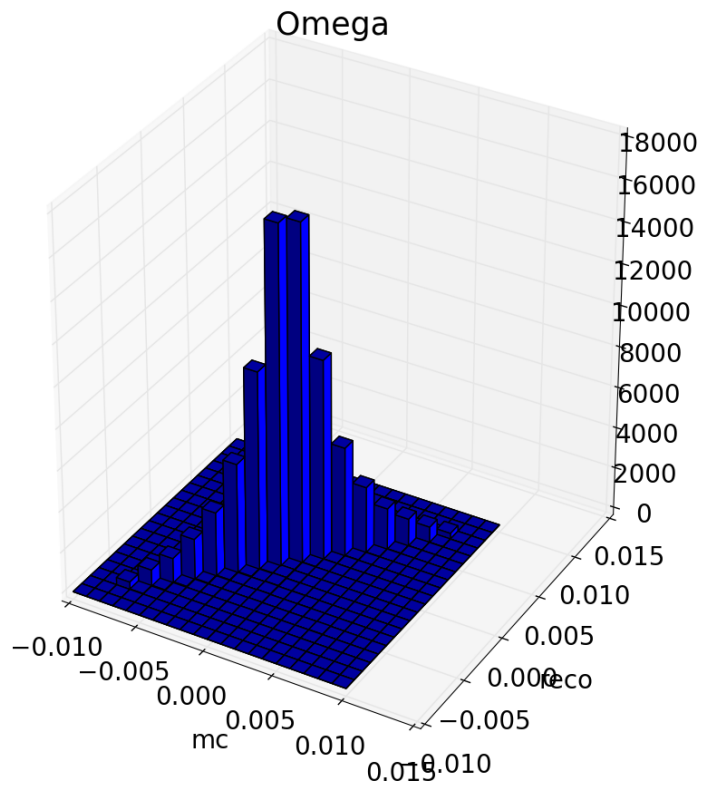


Figure: modified

Z_0 MC / reco comparison

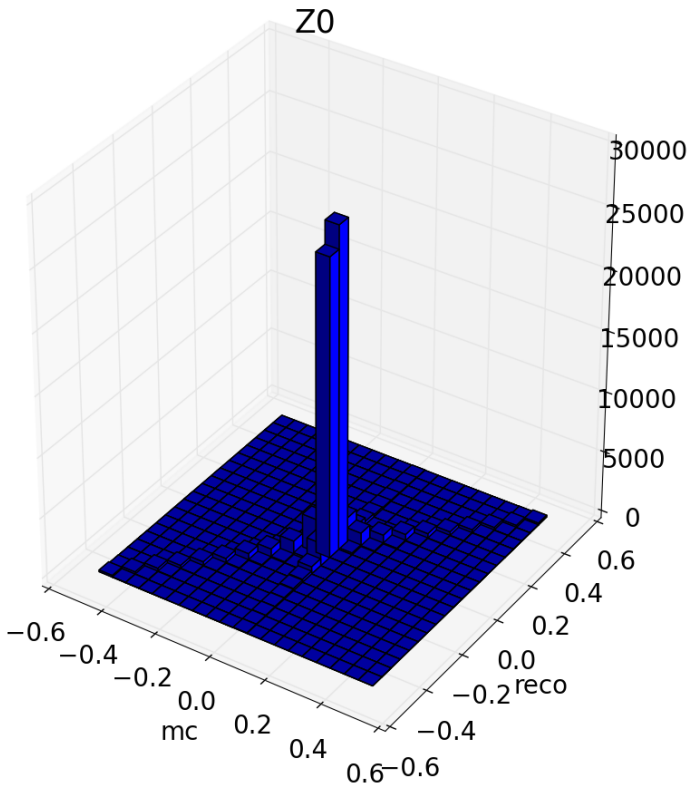


Figure: sidloi3

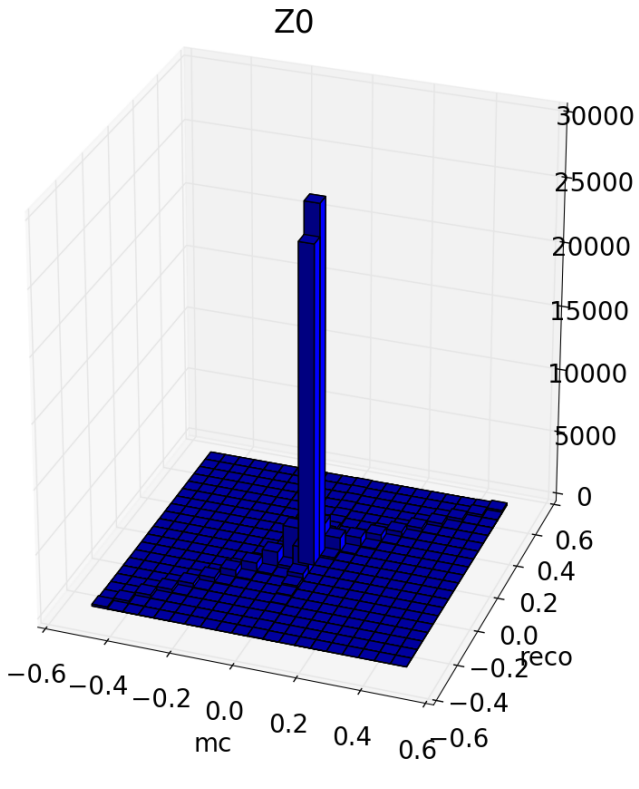


Figure: modified

$\tan\lambda$ MC / reco comparison

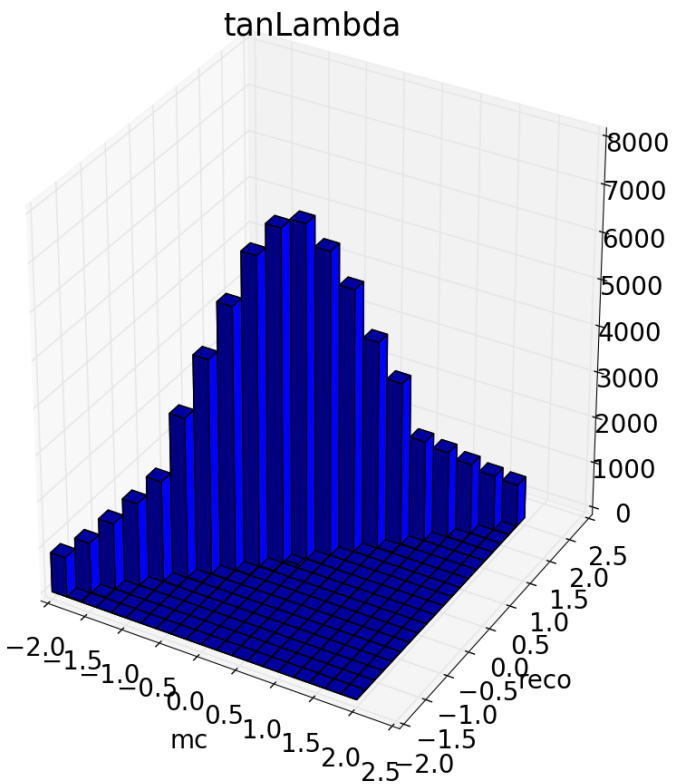


Figure: sidloi3

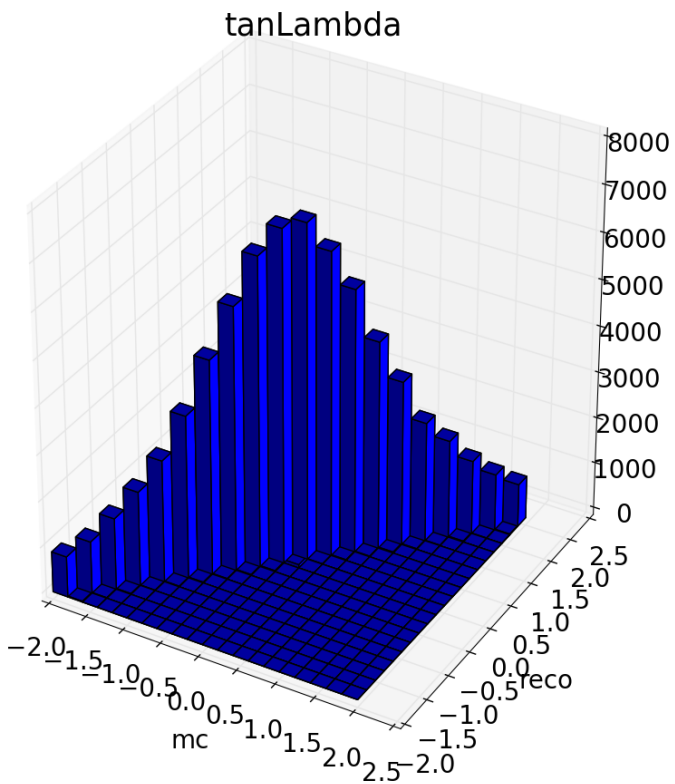


Figure: modified

So these all seem fine however we find something interesting if we filter out the middle section.

The next series of slides show the same plots excluding tracks where the MC and reco parameters are closer than 10 σ

D_0 MC / reco filtered comparison

c

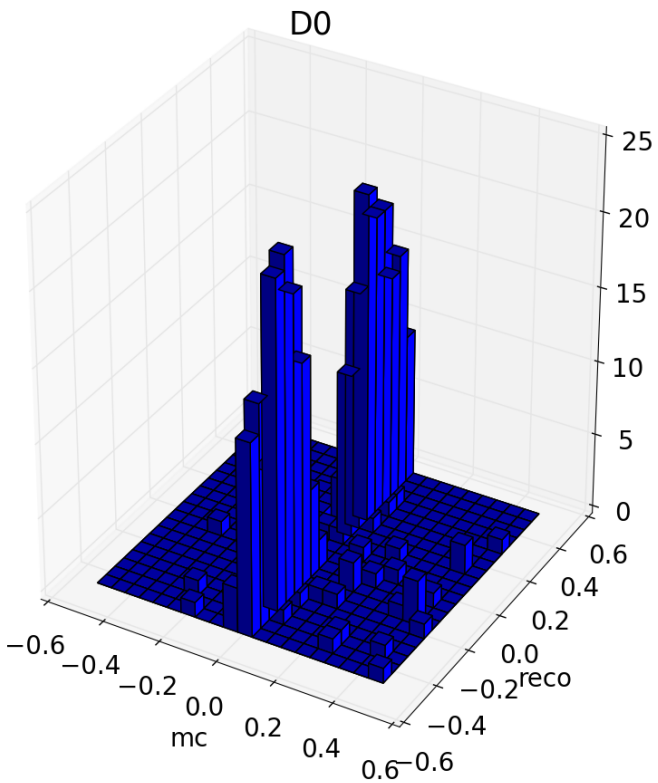


Figure: sidloi3

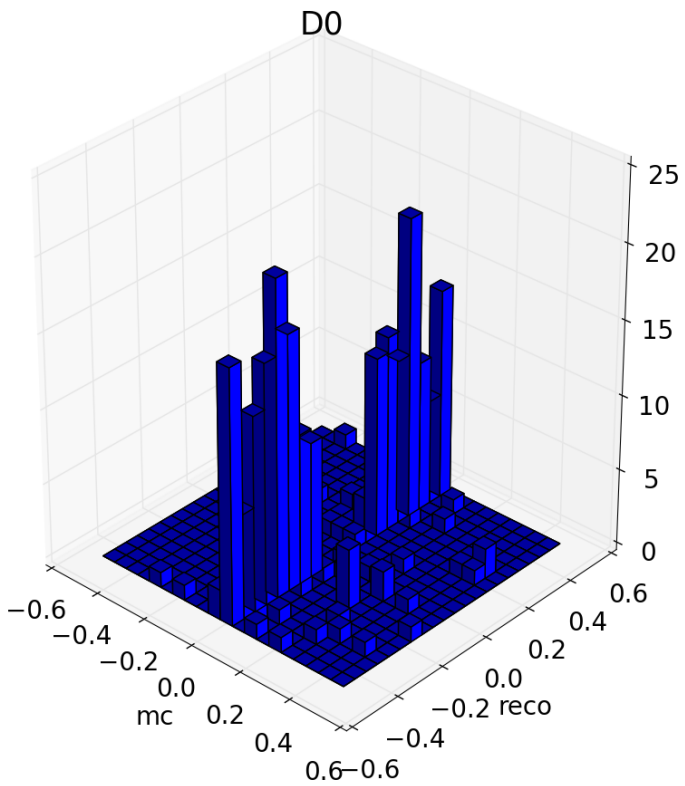


Figure: modified

ϕ_0 MC / reco filtered comparison

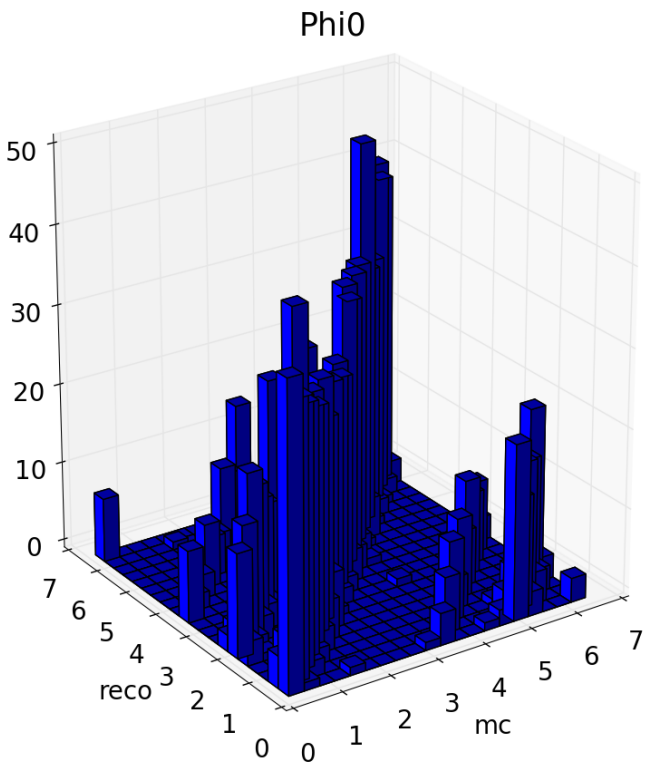


Figure: sidloi3

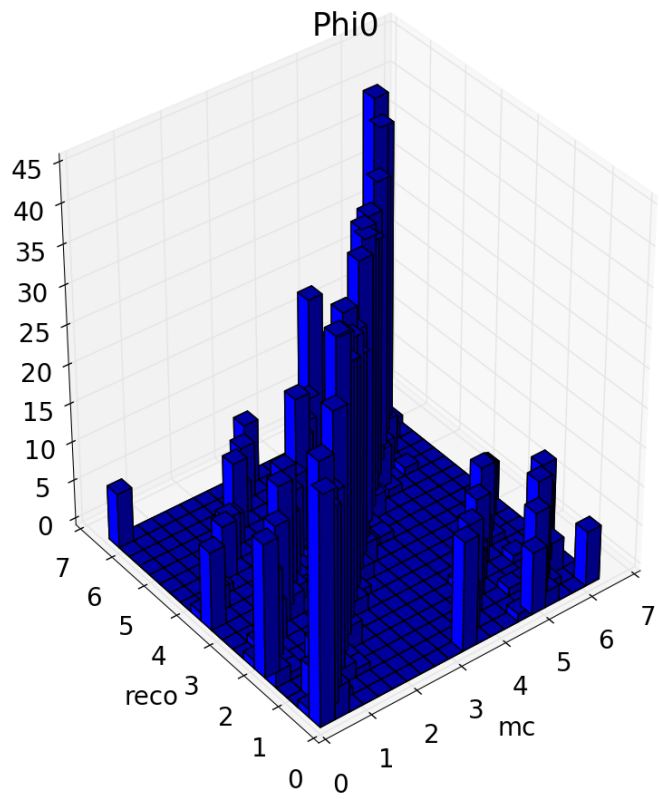


Figure: modified

ω MC / reco filtered comparison

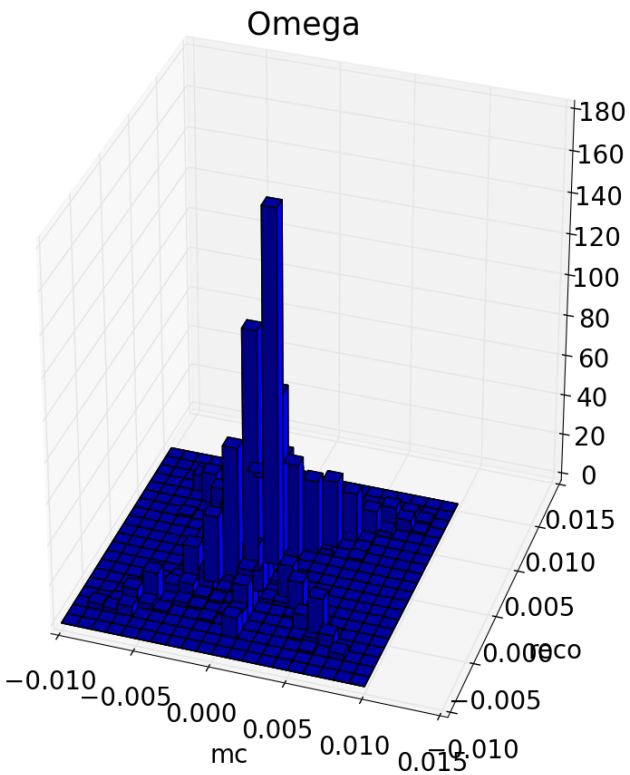


Figure: sidloi3

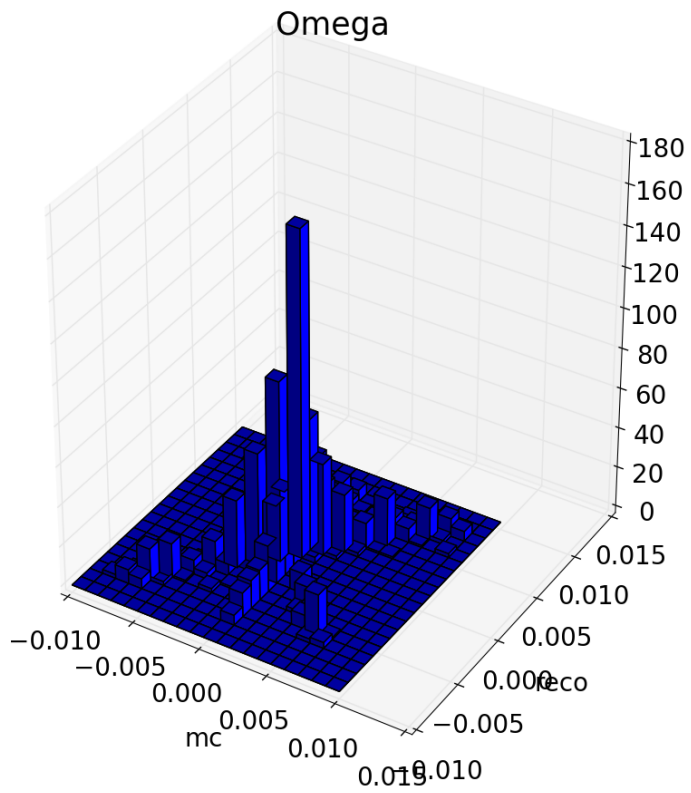


Figure: modified

Z_0 MC / reco filtered comparison

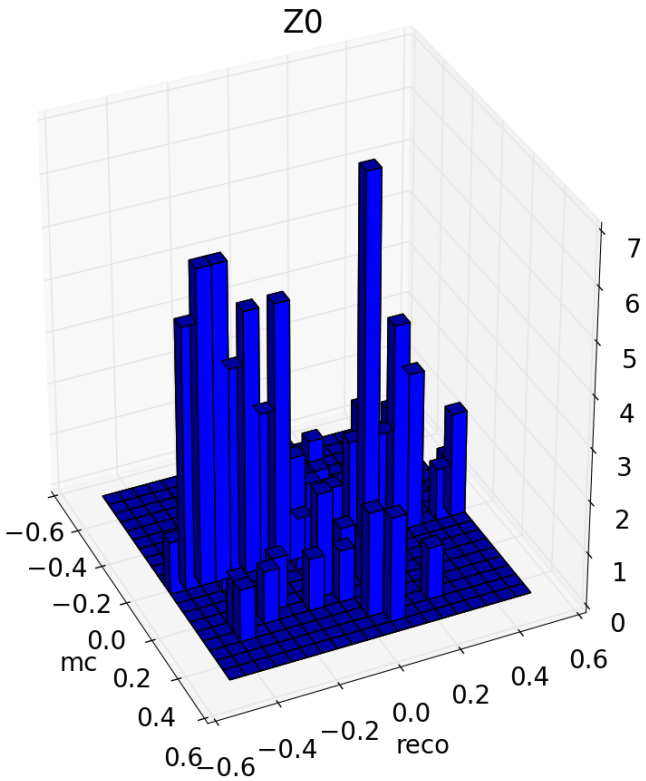


Figure: sidloi3

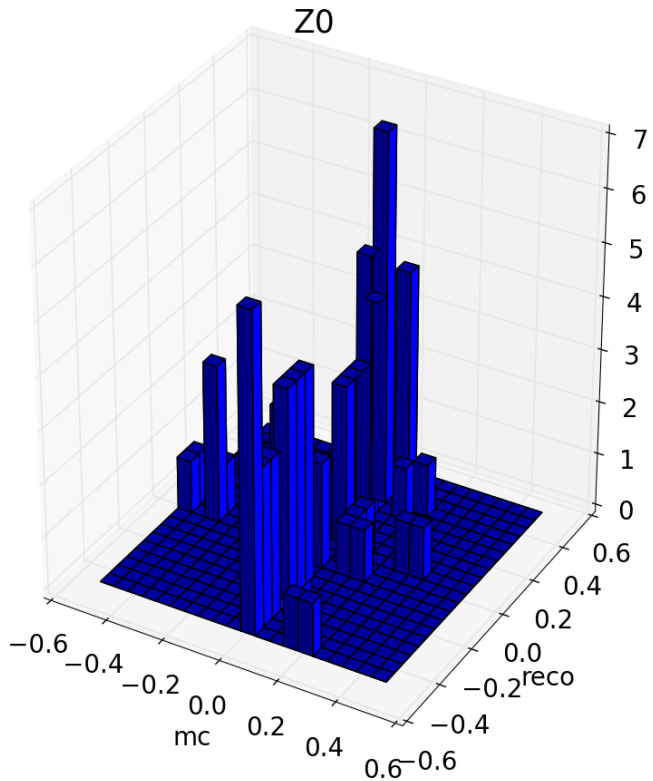


Figure: modified

$\tan\lambda$ MC / reco filtered comparison

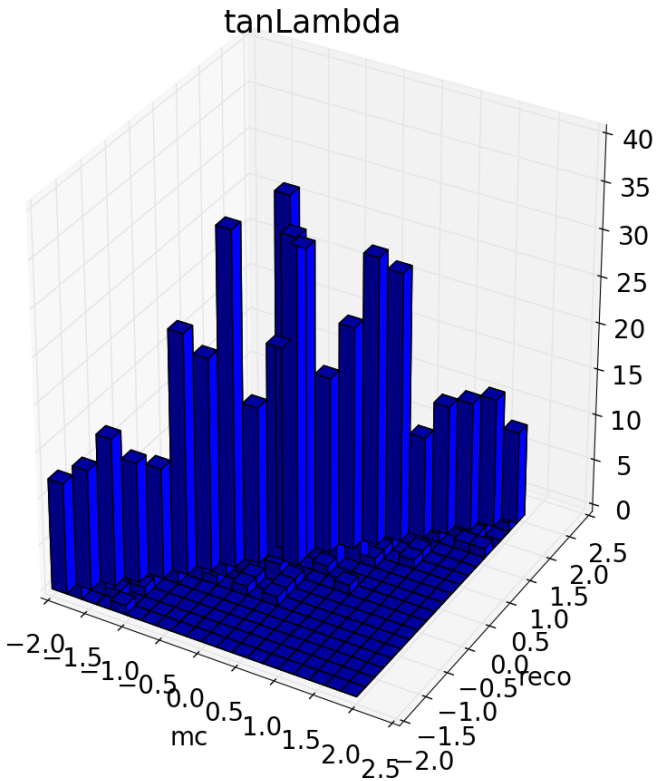


Figure: sidloi3

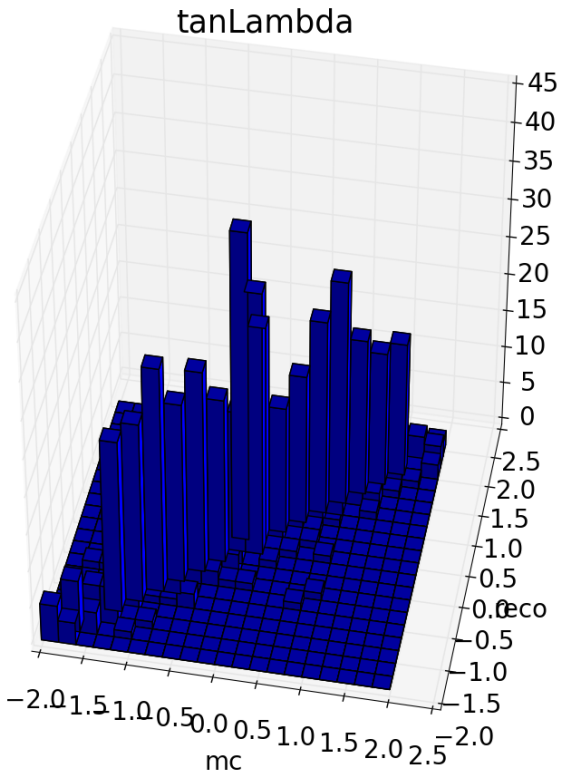


Figure: modified

Now we checked the "pull diagrams" to see any biases in our measurement and to check the estimated error

A non zero μ here indicates a bias in the measurement whilst a σ different from one indicates the reconstruction has either under or overestimated the error.

D_0 pull diagram

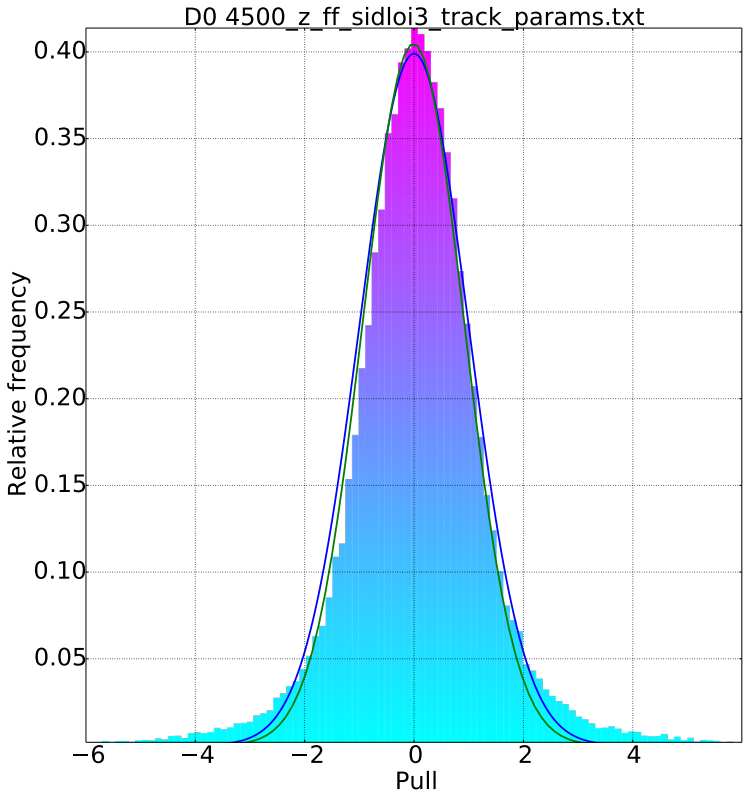


Figure: sidloi3

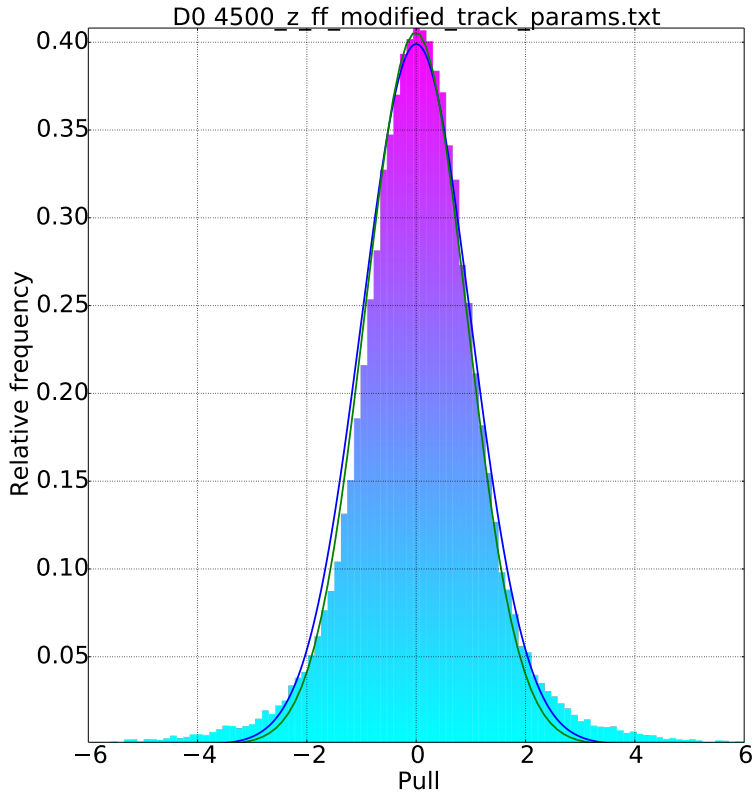


Figure: modified

Figure: A

ϕ_0 pull diagram

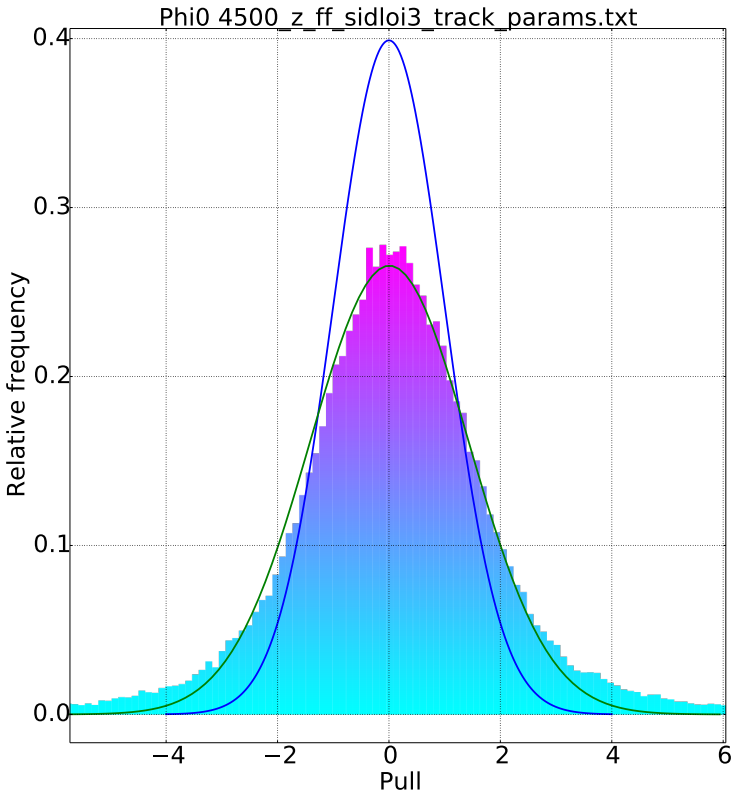


Figure: sidloi3

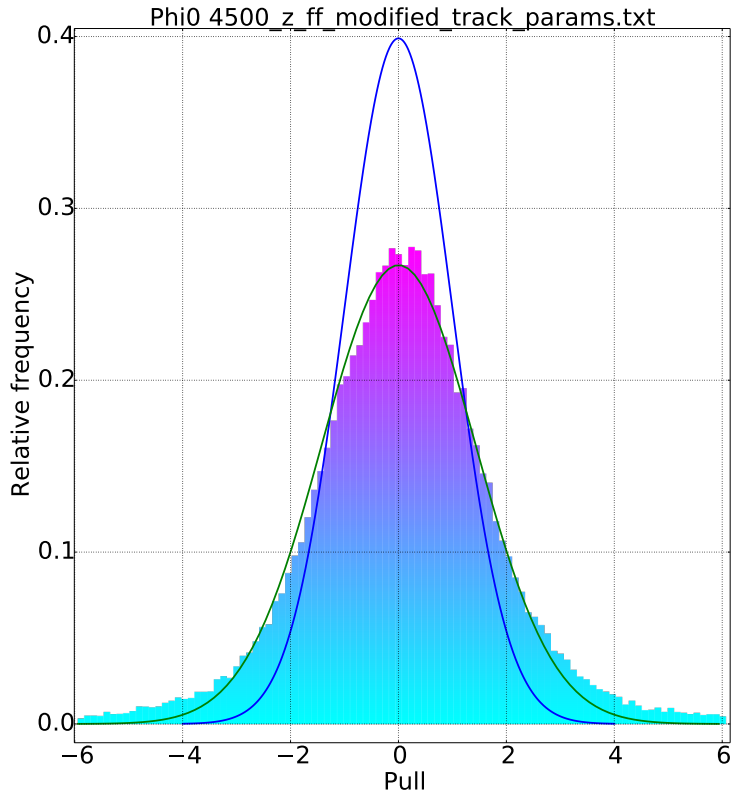


Figure: modified

ω pull diagram

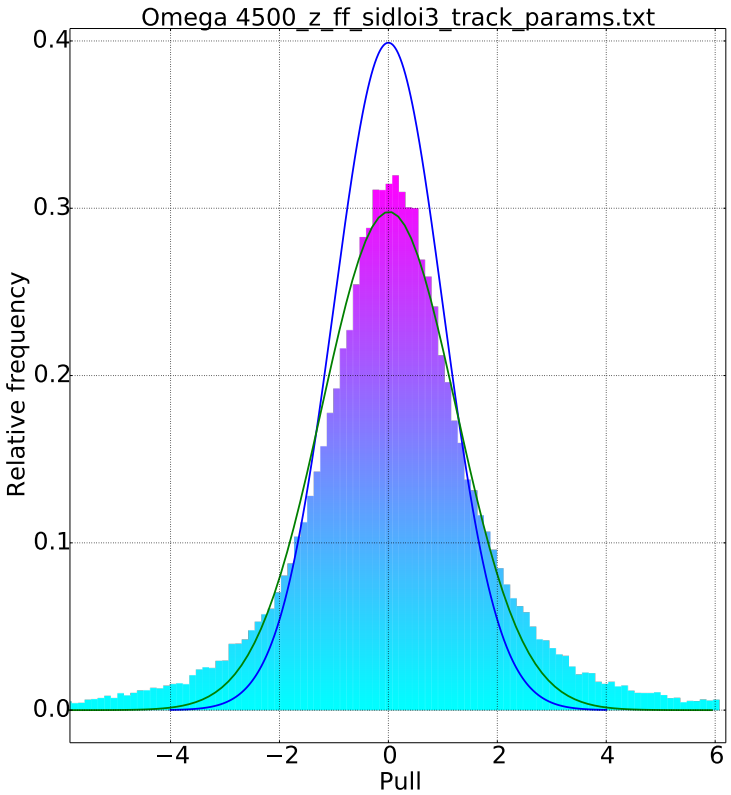


Figure: sidloi3

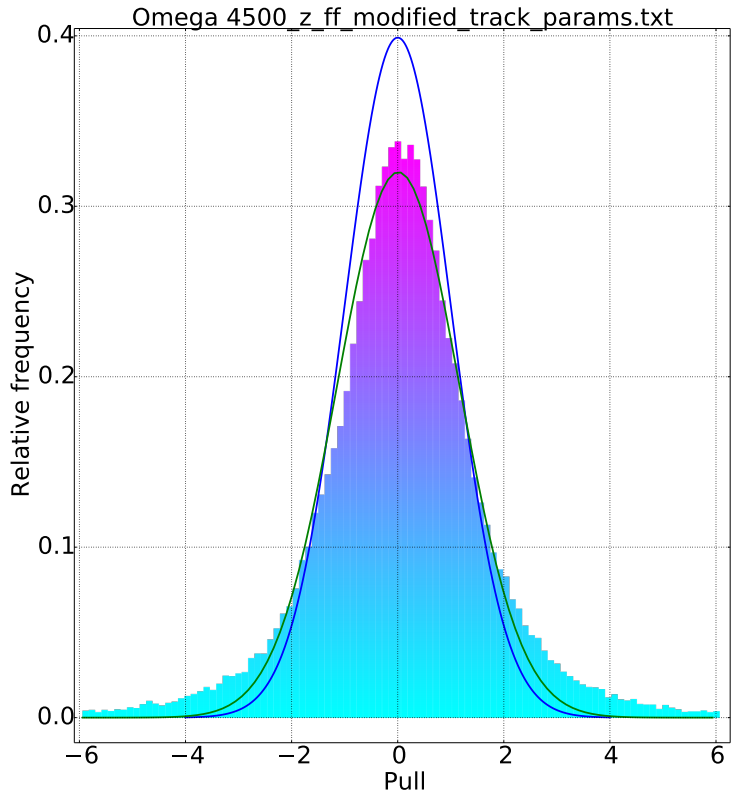


Figure: modified

z_0 pull diagram

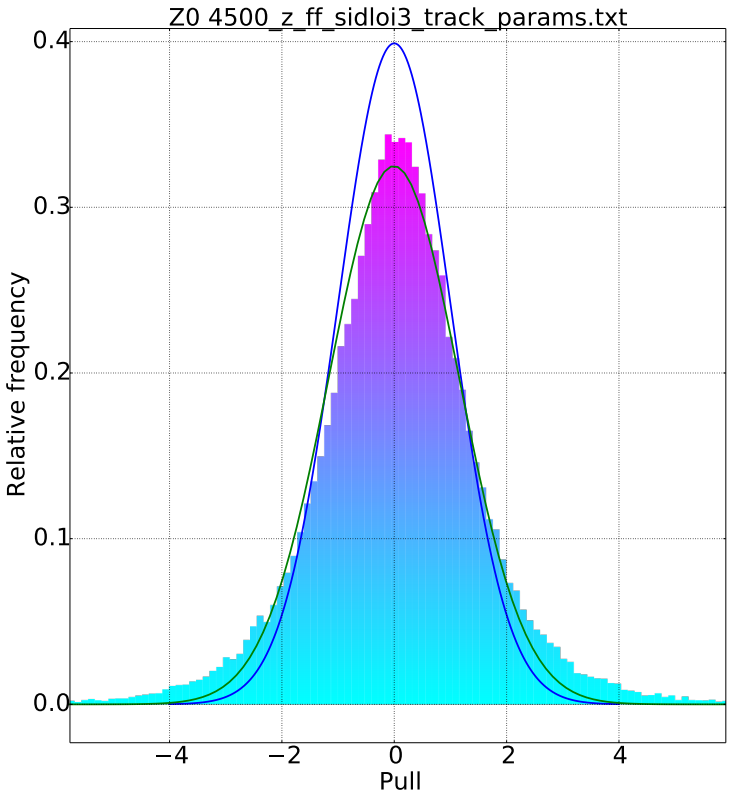


Figure: sidloi3

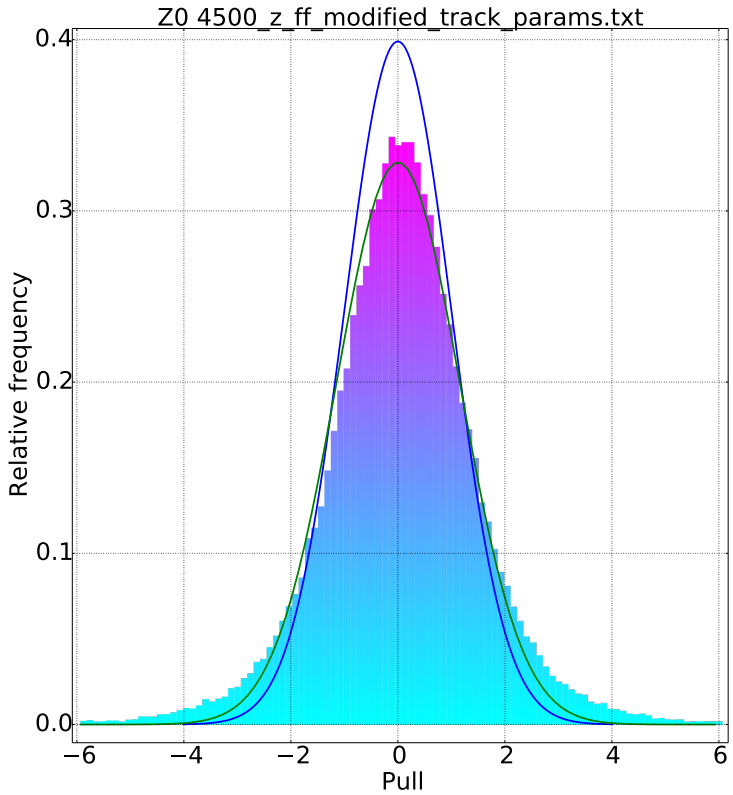


Figure: modified

$\tan\lambda$ pull diagram

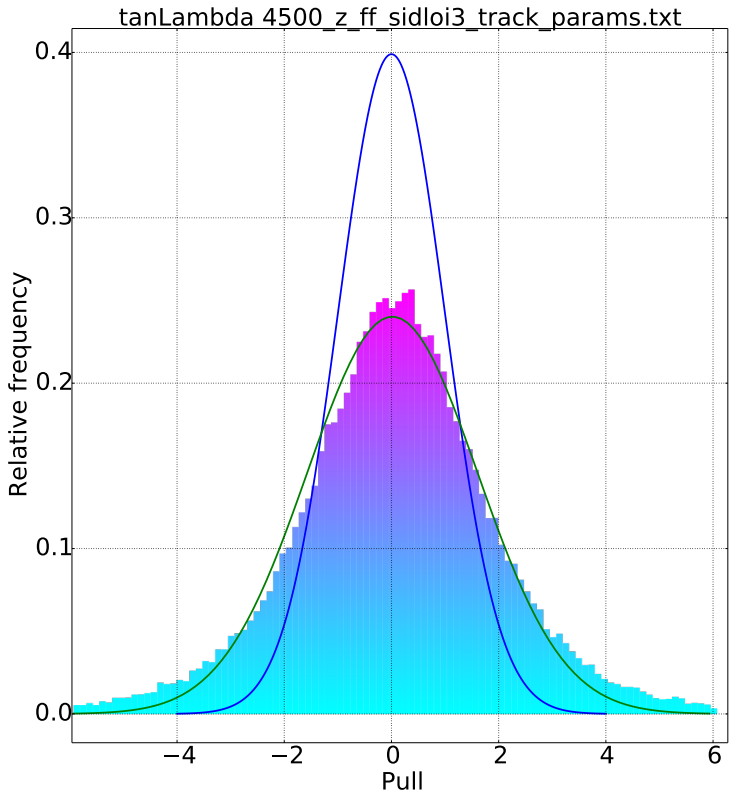


Figure: sidloi3

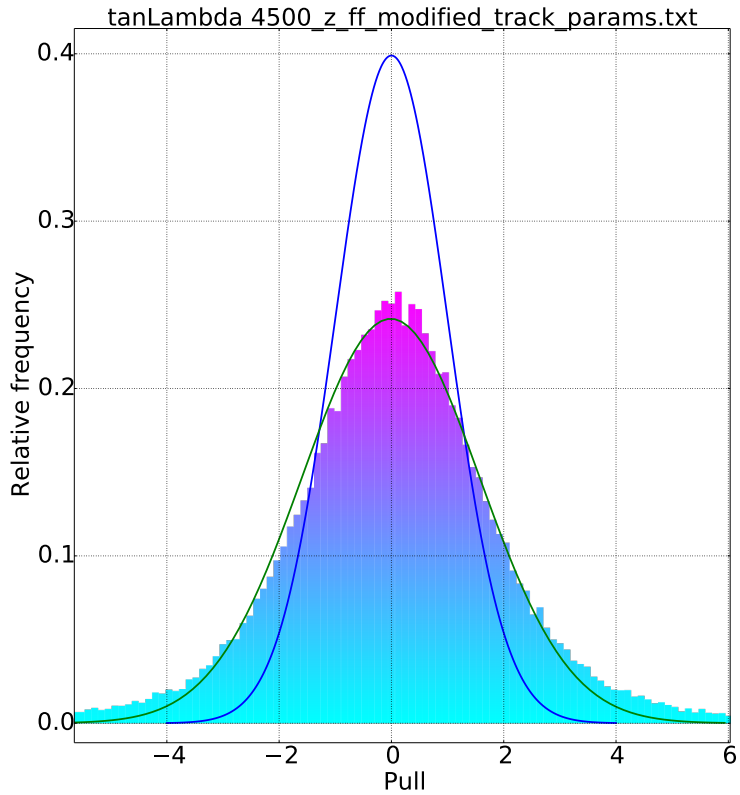


Figure: modified

Track parameters comparison

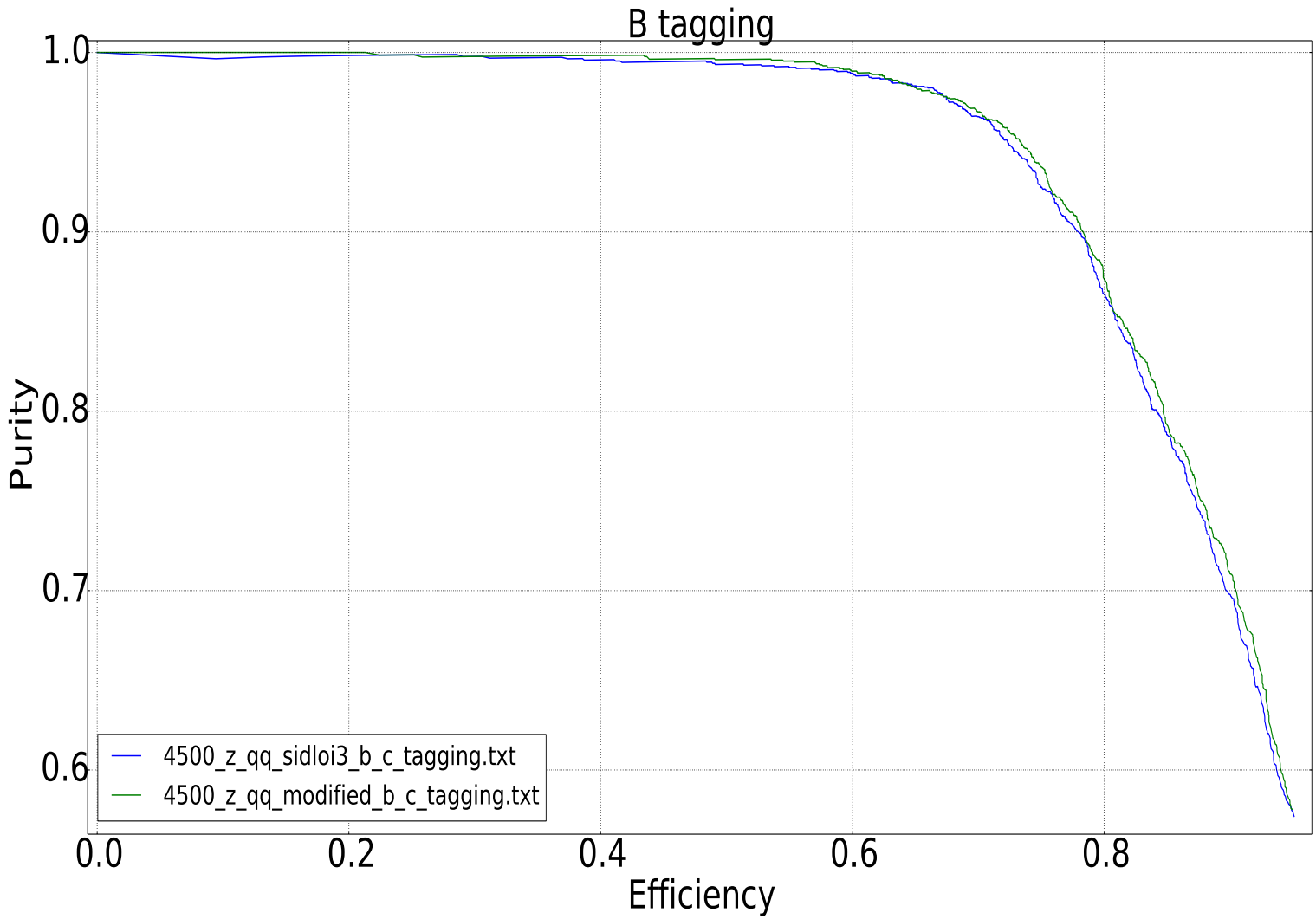
	sidloi3 μ (10^{-3})	modified μ (10^{-3})	sidloi3 σ	modified σ
D_0	-11	-7.4	0.92	0.93
ϕ_0	7.5	3.7	1.4	1.4
ω	9.9	11	1.2	1.1
z_0	-5.4	5.1	1.2	1.1
$\tan\lambda$	18	-11	1.6	1.5

Note that we expect $\mu = 0$ and $\sigma = 1$

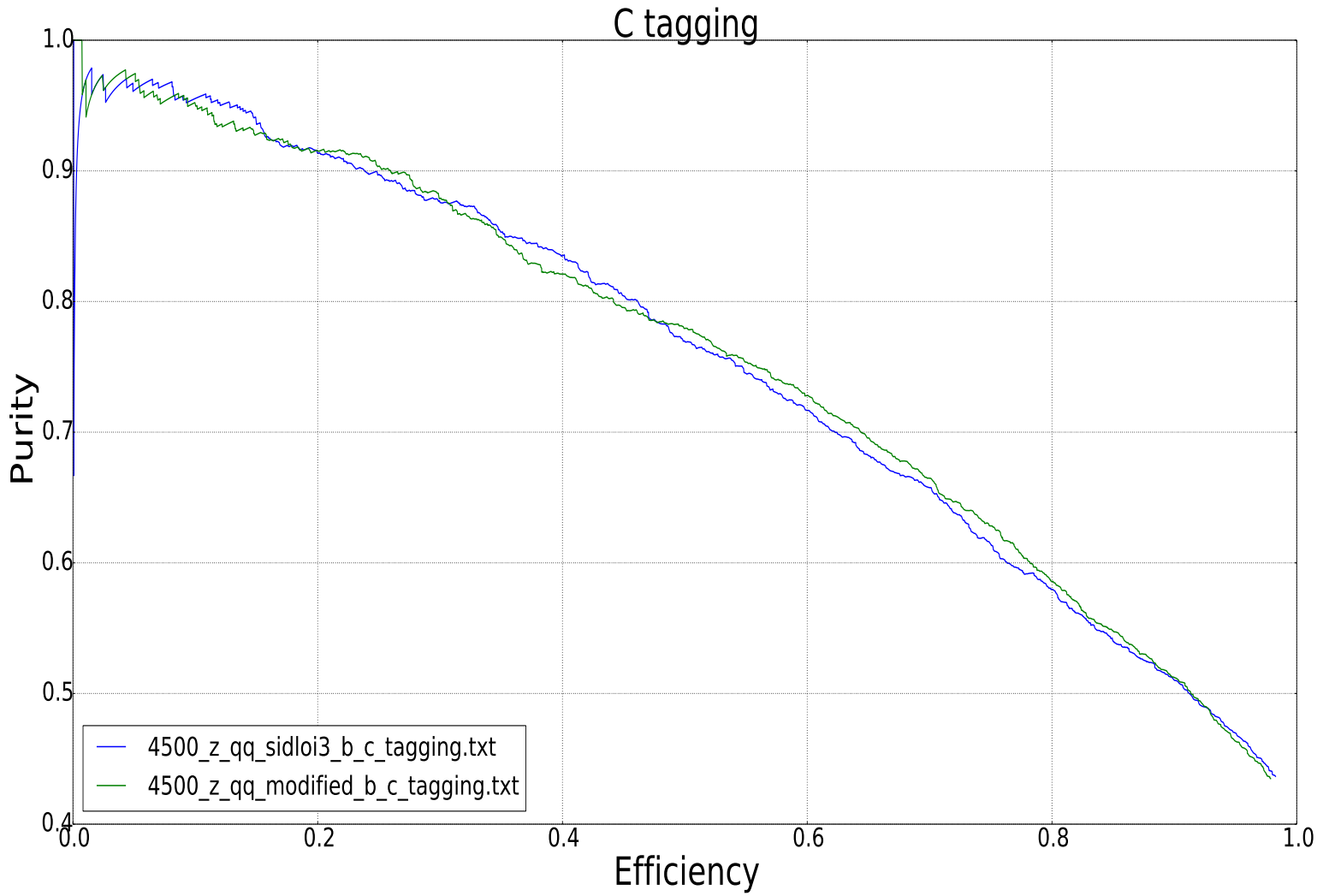
We also looked at higher level B and C tagging efficiencies and purities.

Obviously these shouldn't be trusted until we can explain any and all discrepancies in the lower level parametrisation

B tagging comparison



C tagging comparison



Future Plans

We're interested in an install of the sim-reco chain on a local server here

Jan pointed us towards the dev toolset yesterday which should make this easier

Would like to do more analysis on different detector modifications, understanding the extra lines on the scatter plots

We need more statistics!

The End