

Instrumental Asymmetry

$$D^+ \rightarrow K_S^0 \pi^+$$

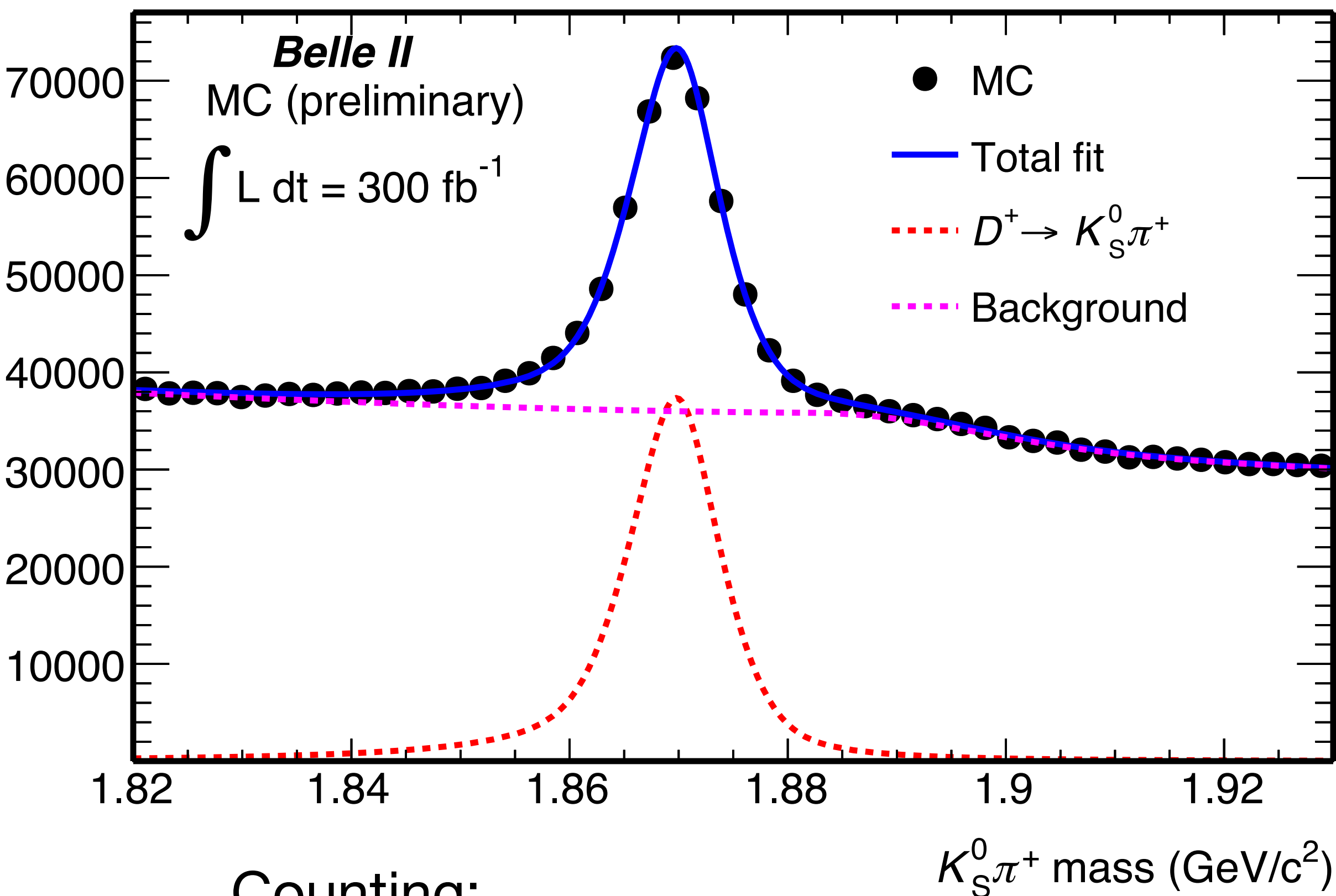
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Analysis Meeting

May 27, 2022

Fit to MC

$$\mathcal{A}_{obs} = -0.0018 \pm 0.0028$$



Counting:

D^+ signal: 212862

D^+ bkg: 1748027

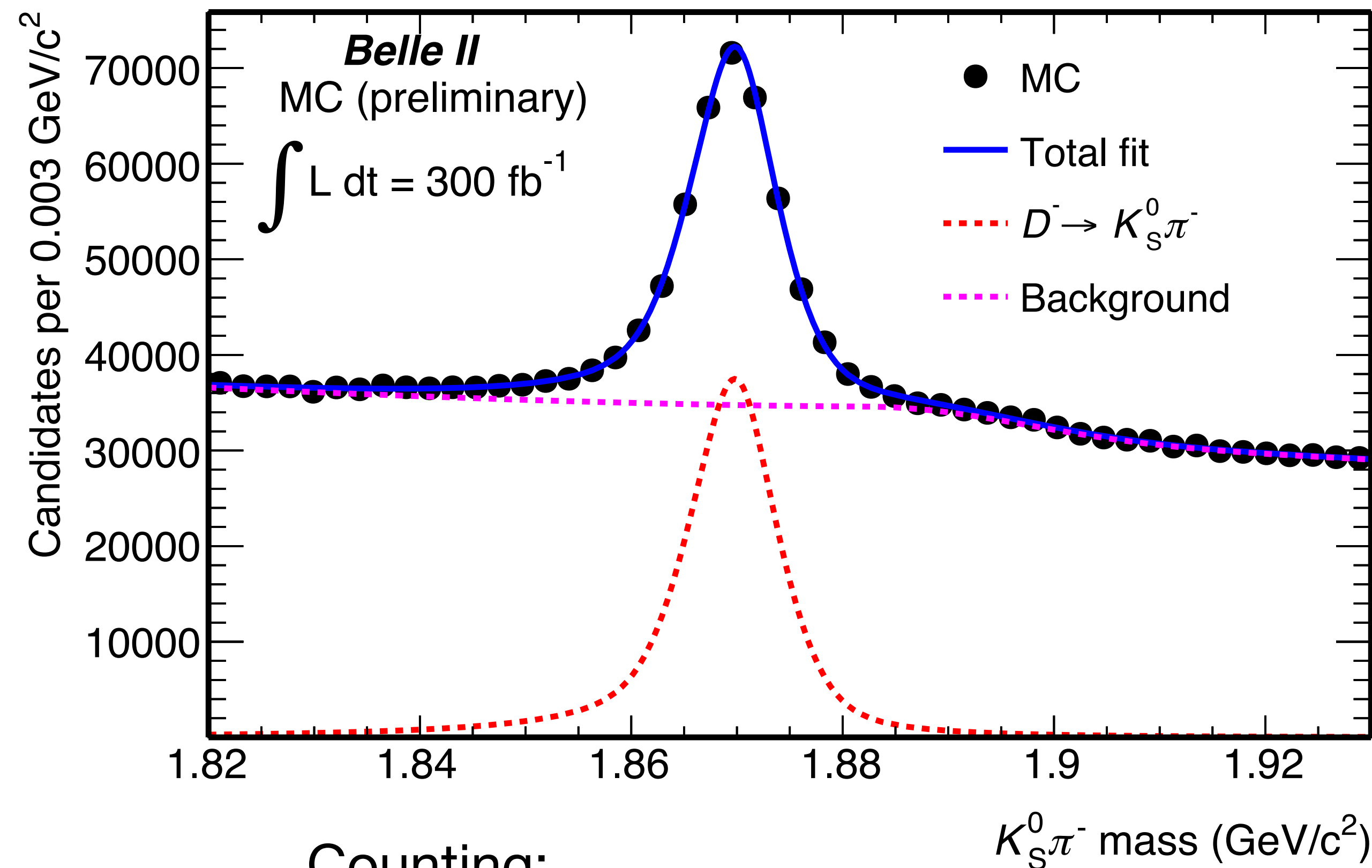
D^+ Total: 1960889

2.13 σ

Fit:

D^+ signal: 215601 ± 1286

D^+ bkg: 1745287 ± 1286



Counting:

D^- signal: 213498

D^- bkg: 1687679

D^- Total: 1901177

2.23 σ

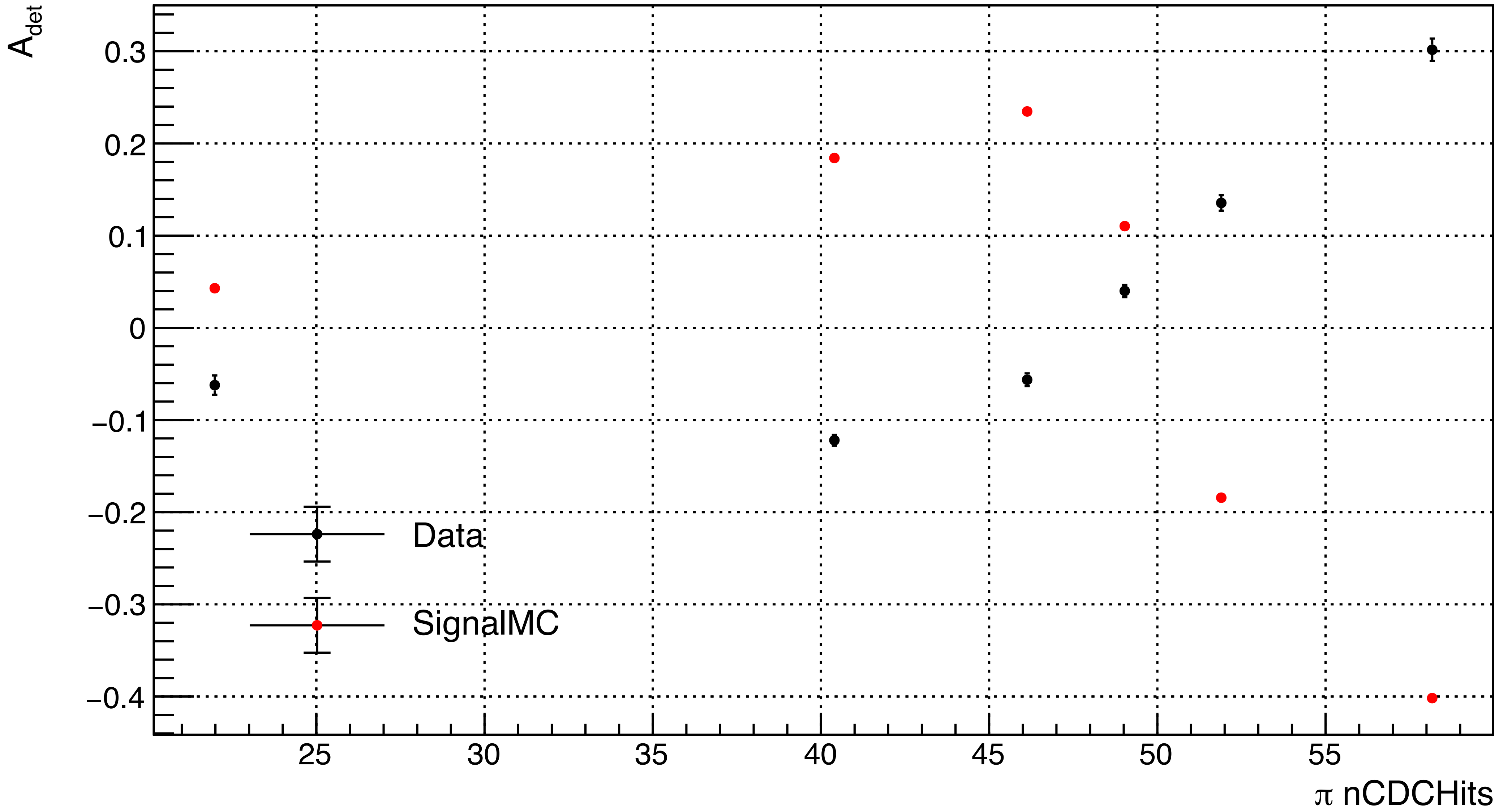
Fit:

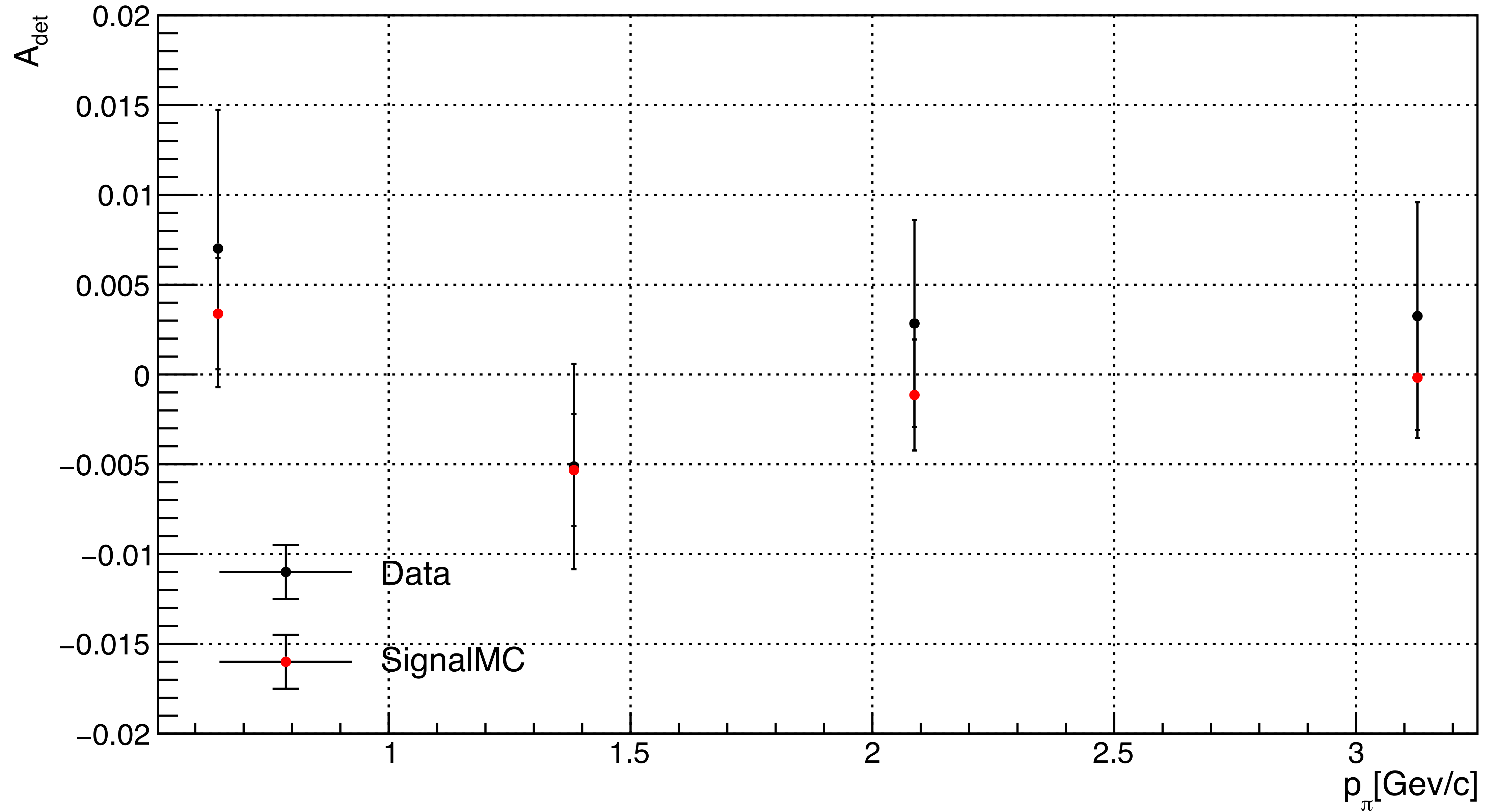
D^- signal: 216378 ± 1290

D^- bkg: 1684798 ± 1290

CDC hits

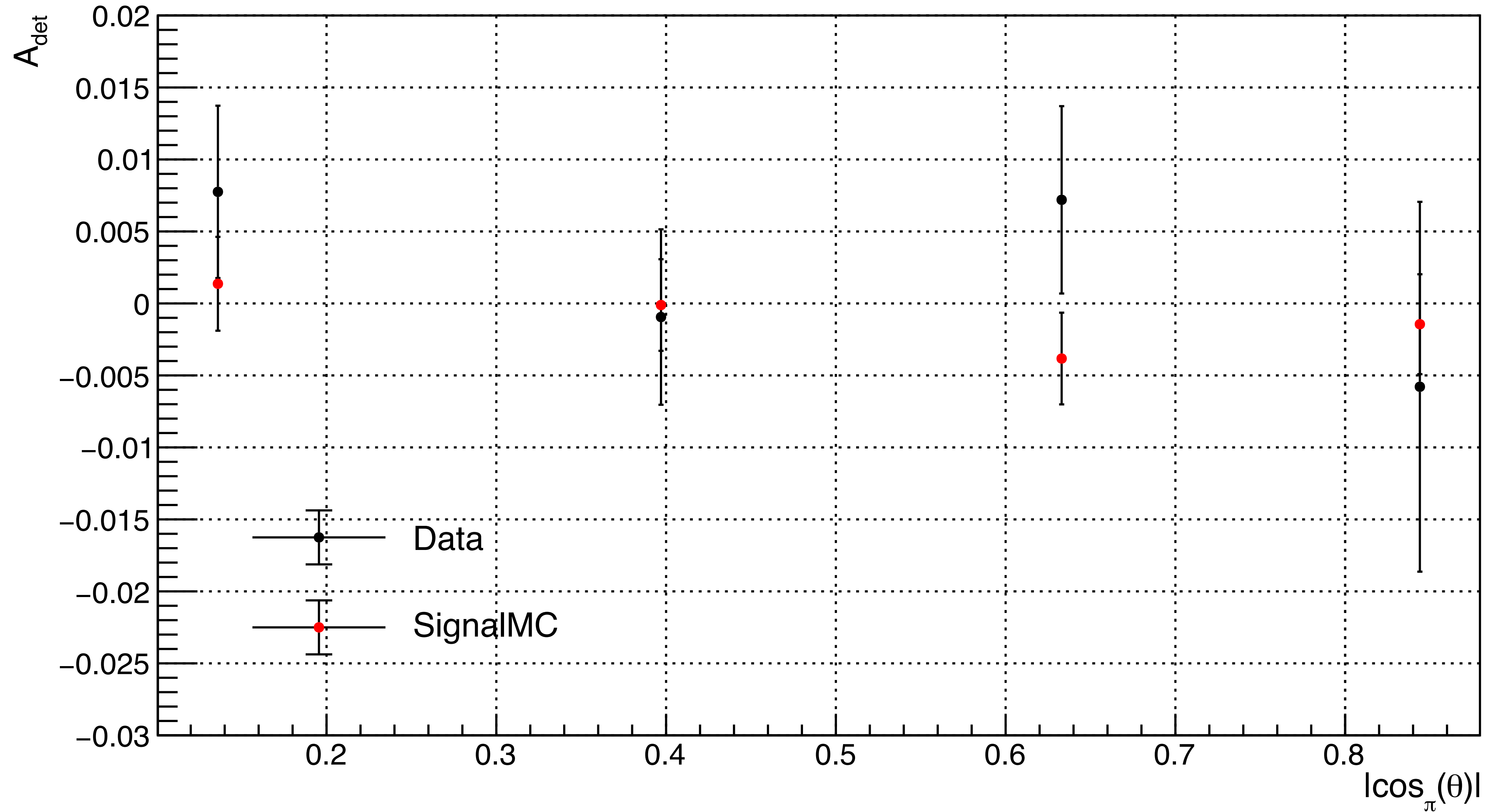
Strong dependence of \mathcal{A}_{det} on CDC hits



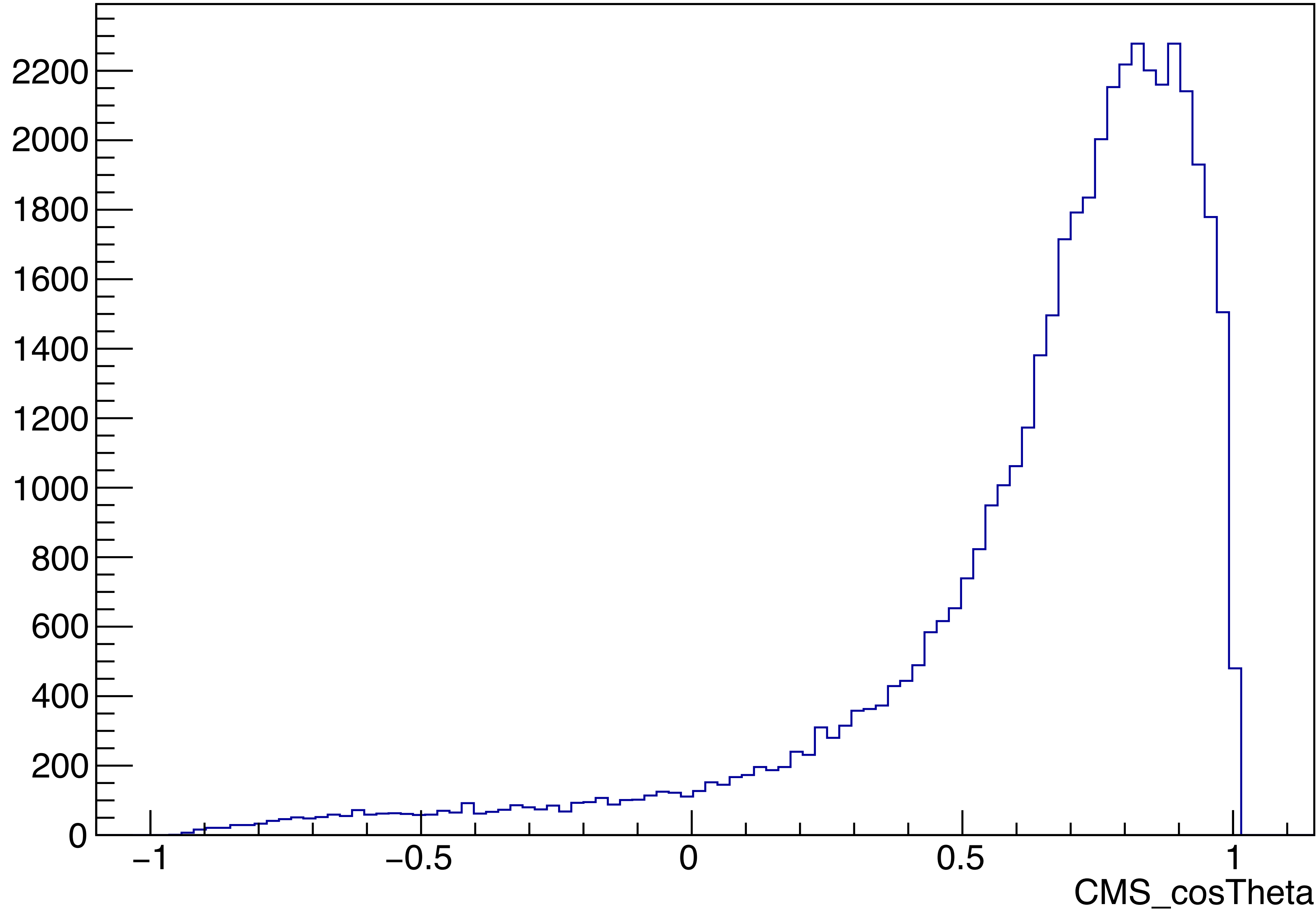
p_π Low dependence of \mathcal{A}_{det} on momentum

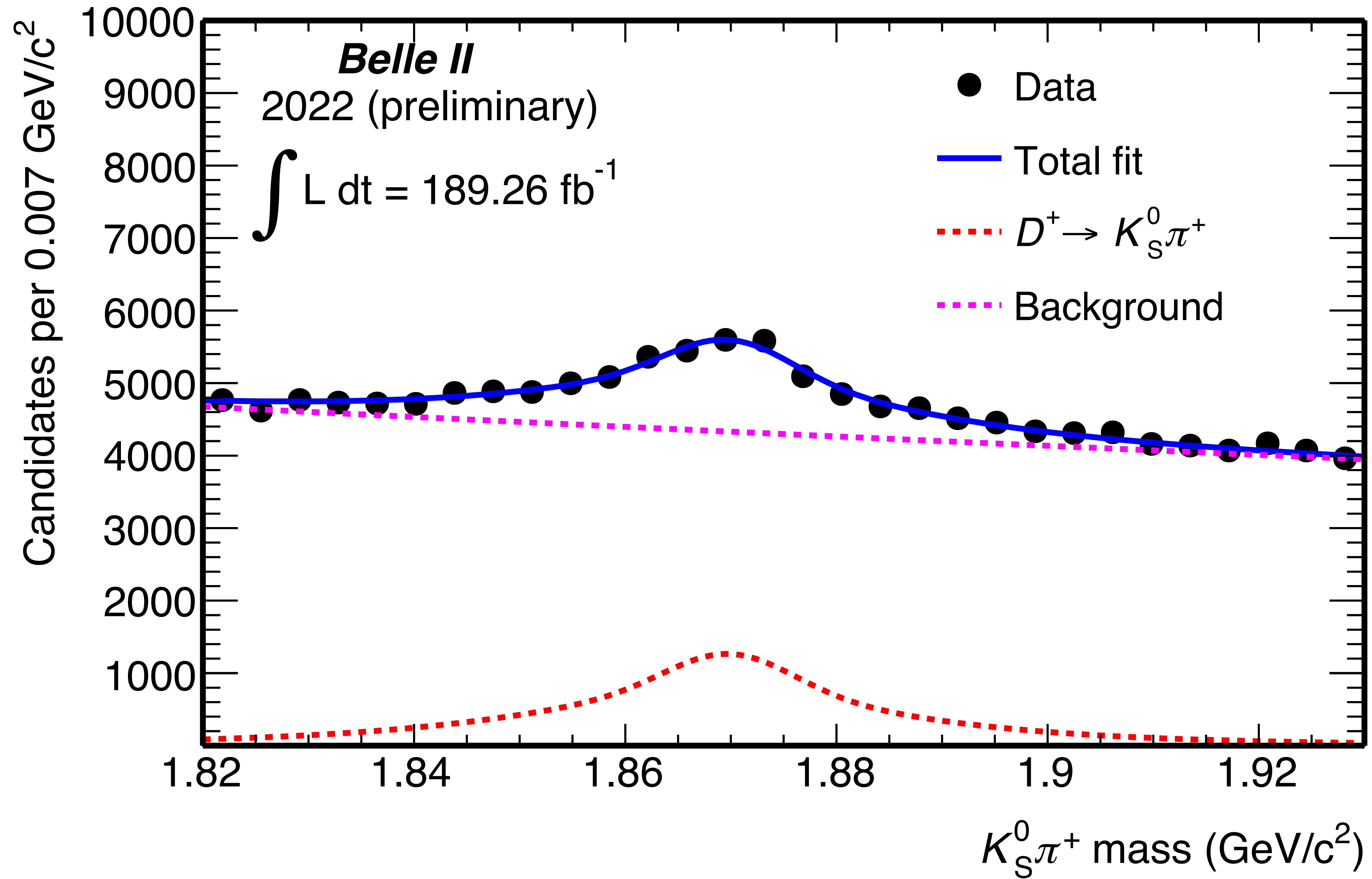
$|\cos_{\pi}(\theta)|$

Low dependence of \mathcal{A}_{det} on polar angle

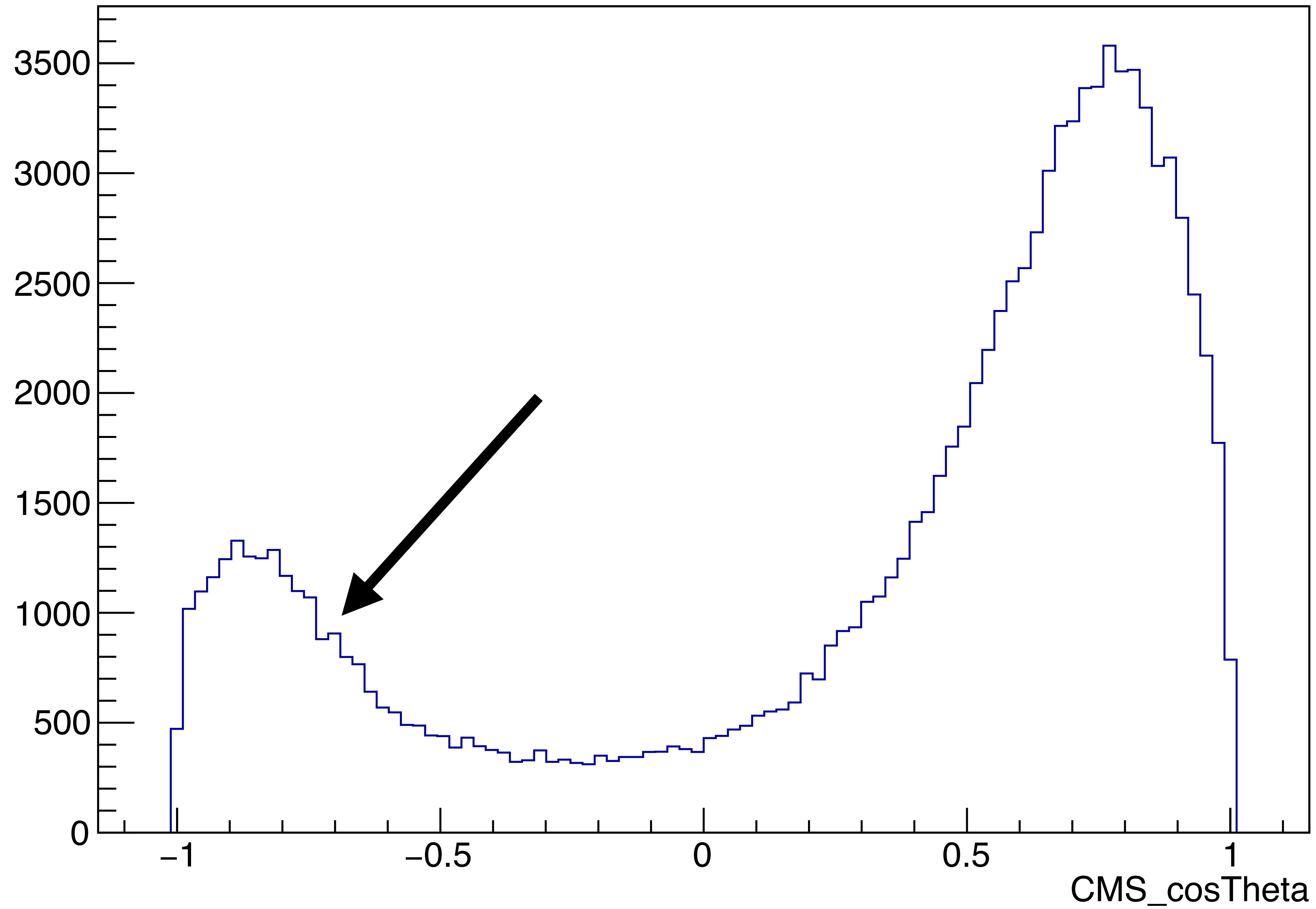


$$\cos_{\pi}(\theta) > 0.85$$

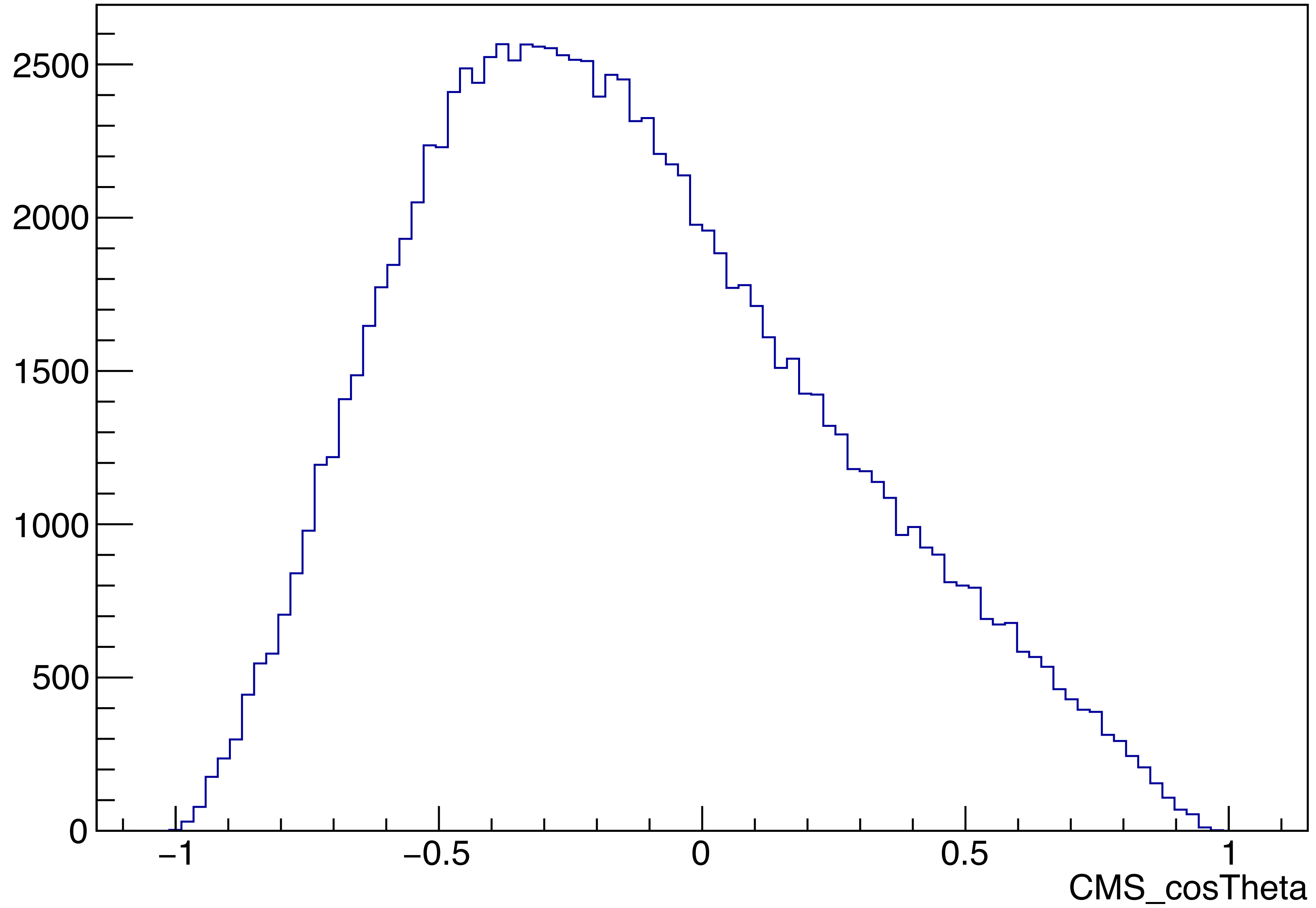




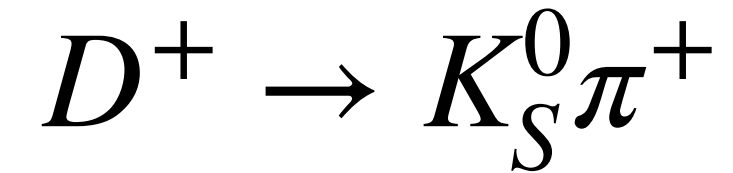
$$|\cos_{\pi}(\theta)| > 0.74$$



$$|\cos_{\pi}(\theta)| < 0.28$$



signalMC



Without reweighting: $\mathcal{A}_{det} = -0.0014 \pm 0.0015$

Reweighting:

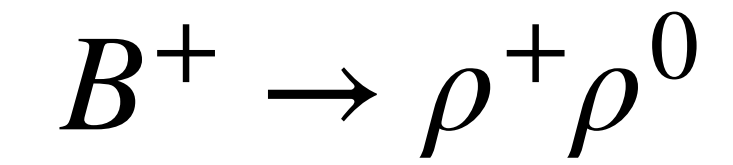
1. Reweighting with CDC hits distribution: $\mathcal{A}_{det} = -0.0635 \pm 0.0015$

Weight: Division of $\pi(\rho^+ \rho^0)$'s CDC hits histogram by $\pi(D^+)$'s CDC hits histogram

2. Weighted average of \mathcal{A}_{det} in each bin of D_π 's CDC hits where weights are the ratio of frequency of ρ_π 's CDC hits in that bin to the total no. of hits.

$$\mathcal{A}_{det} = -0.0068 \pm 0.0015$$

Target



$$\mathcal{A}_{det} = +0.0041 \pm 0.0012$$

$$\frac{N(B^+) - N(B^-)}{\Sigma}$$

$\pi_nCDCHits$

A_{det}

