Isolated Lepton Tagging for new samples

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ILD Software conveners Meeting, July 11, 2018

update since last report

- commit to GitHub: done (fixed processor, new weights files trained for new samples)

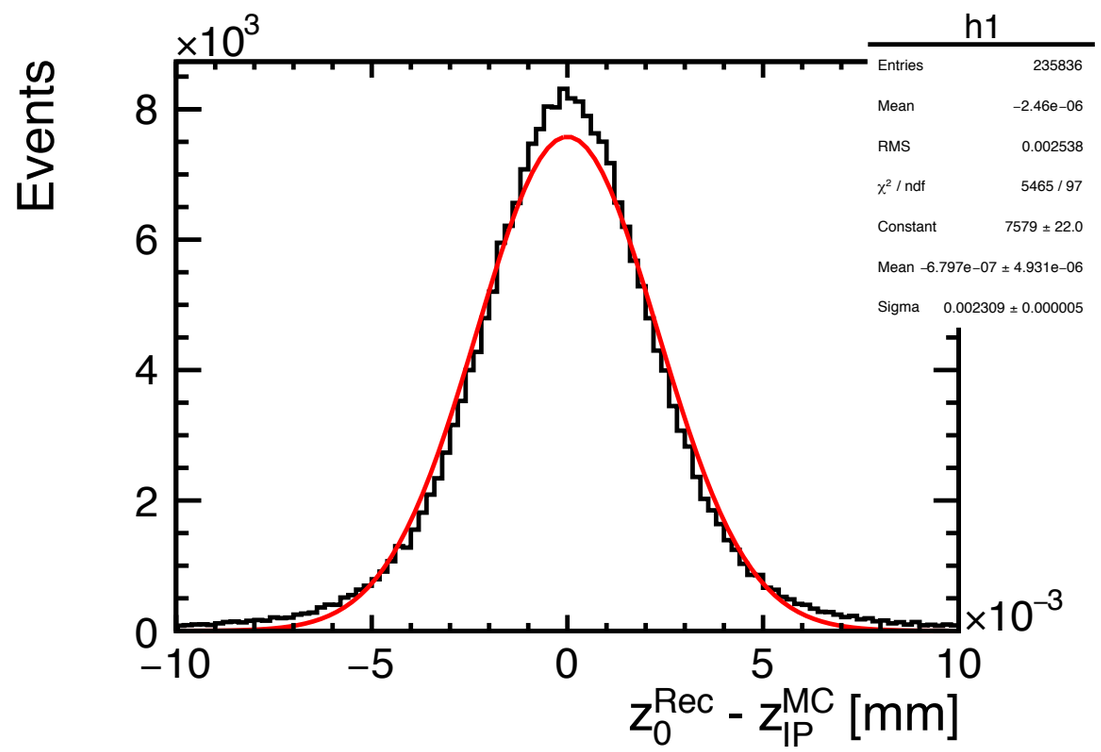
- puzzle about 1-2 μm σ_{IP}: resolved

- performance degradation w.r.t. DBD: under-investigation

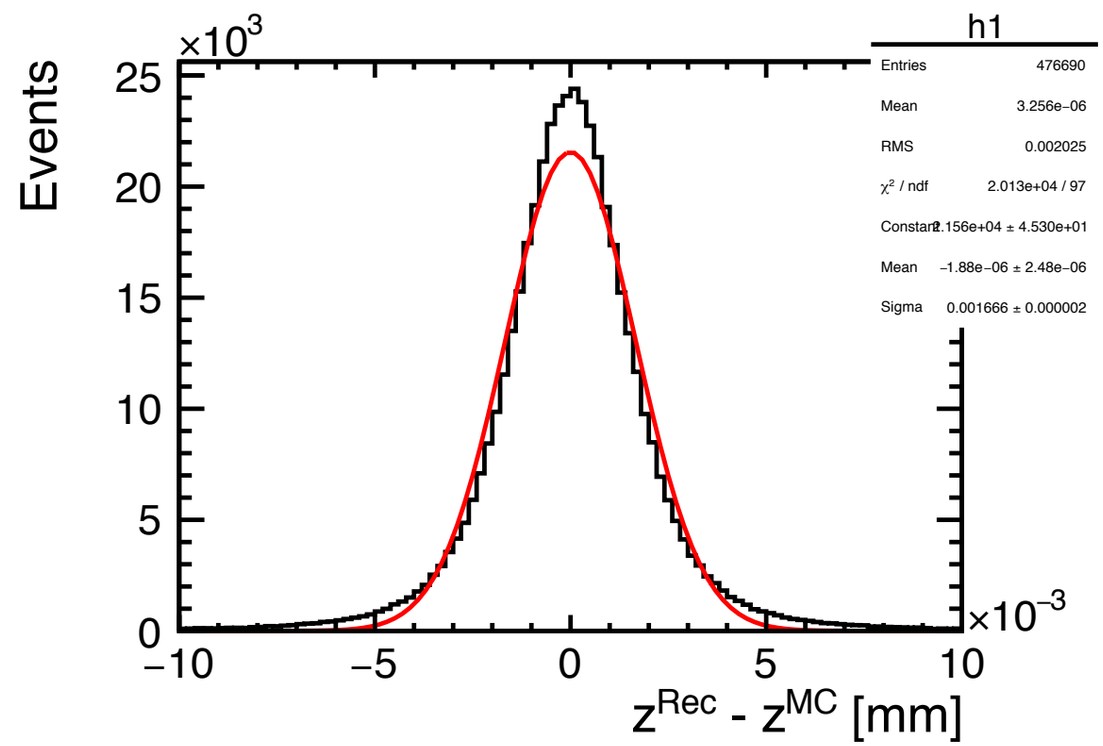
the puzzle about σ_{IP}

sample: yyxylv, average ~30 tracks

impact parameter for isolated μ (z_0)



primary vertex position (z)

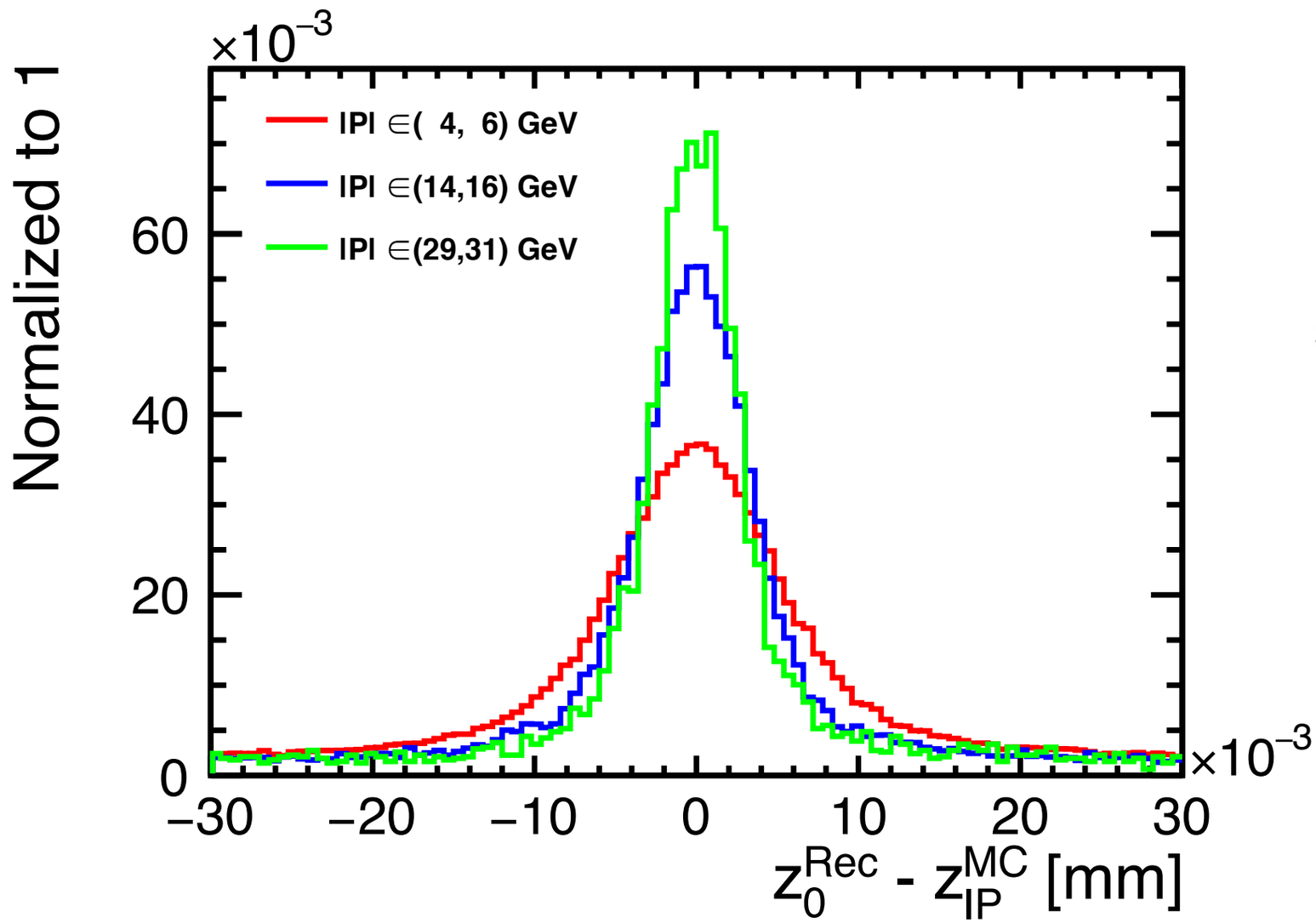


σ~2.3 μm

σ~1.7 μm

the puzzle about σ_{IP} : resolved

- large dependence on momentum (and polar angle)
- one isolated muon is as useful as O(10) tracks in a jet

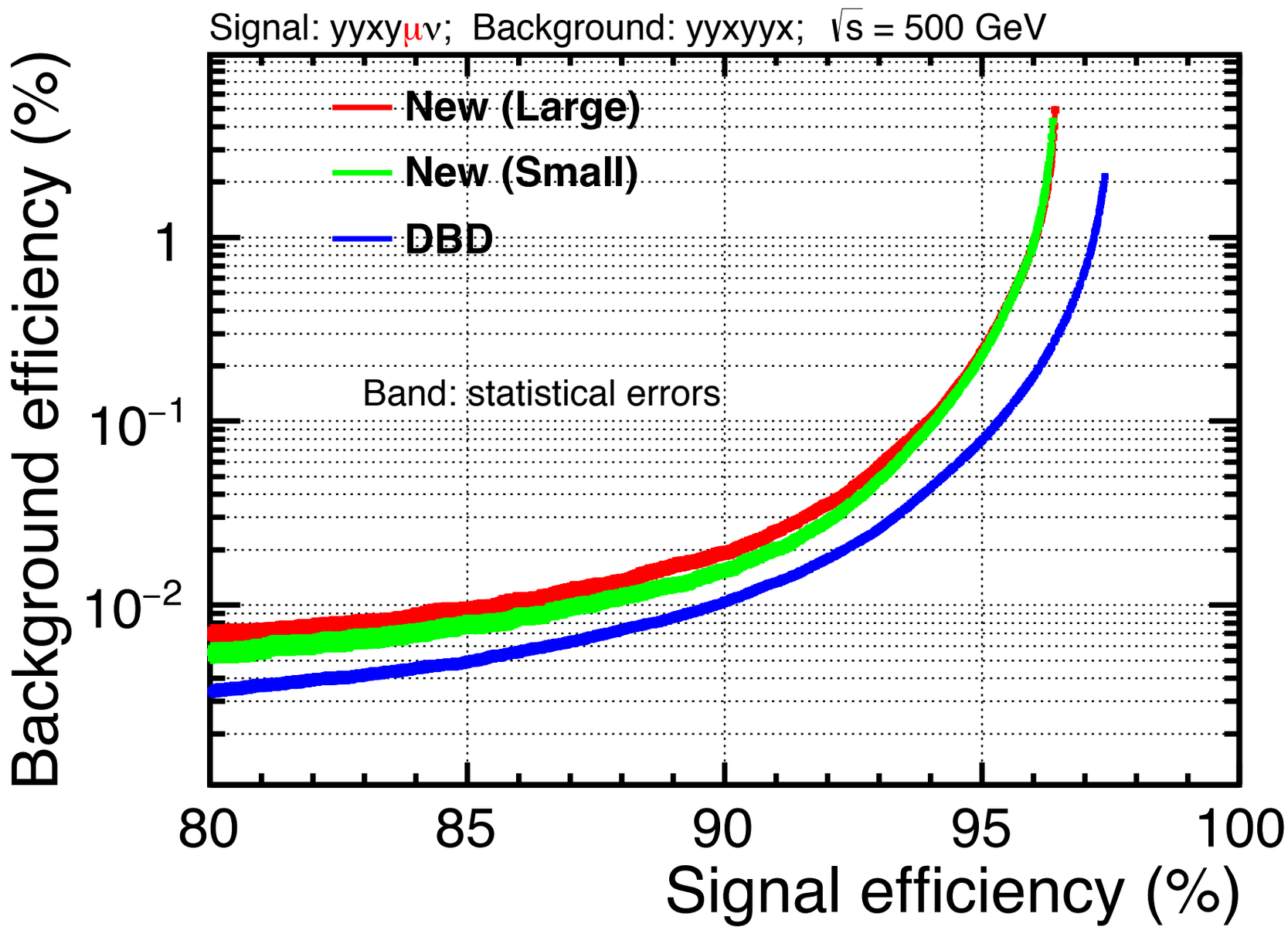


sample: 6q,
no overlay

thanks to R.Yonamine for many useful checks

Isolated Lepton Tagging performance

(muon)

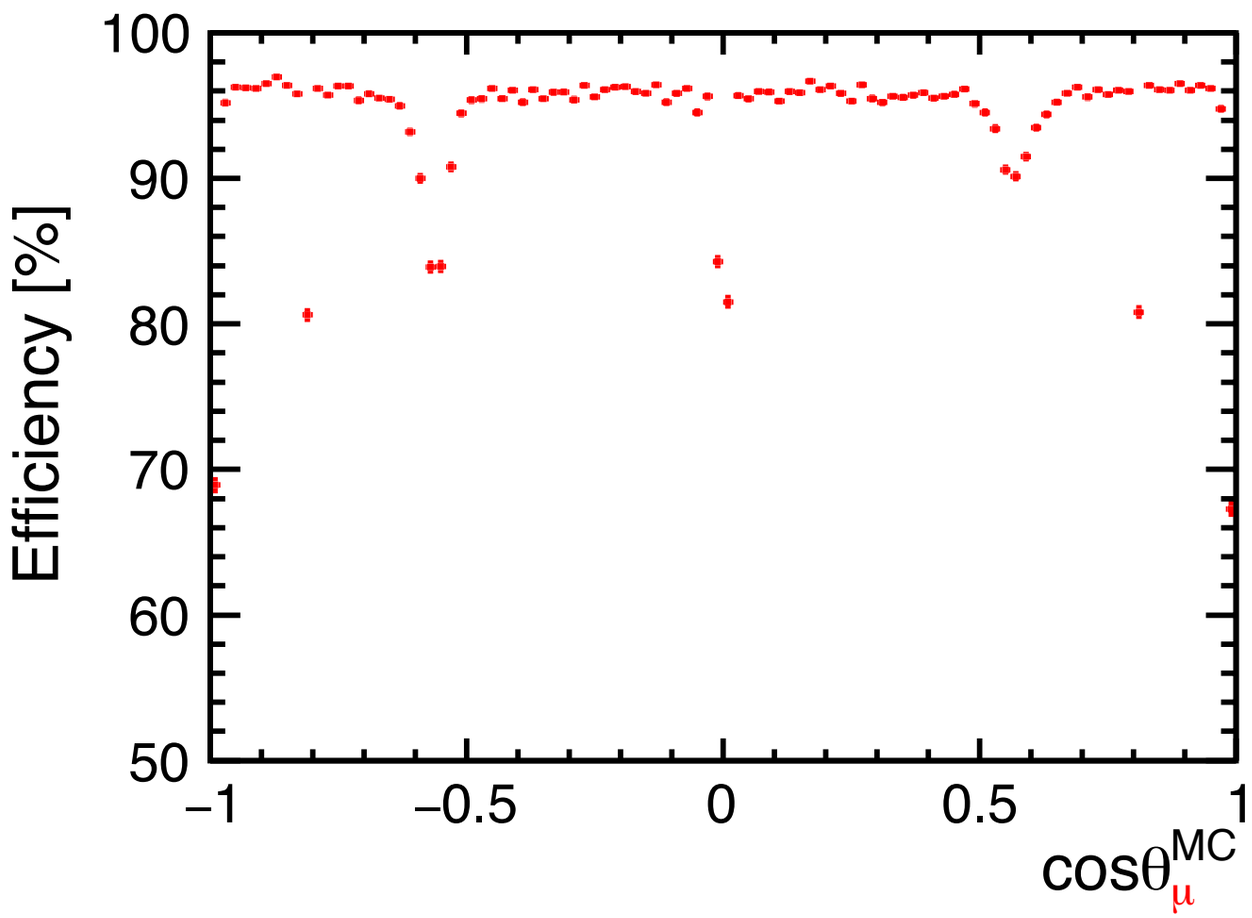


~2% signal efficiency drop for 0.1% bkg: reason?

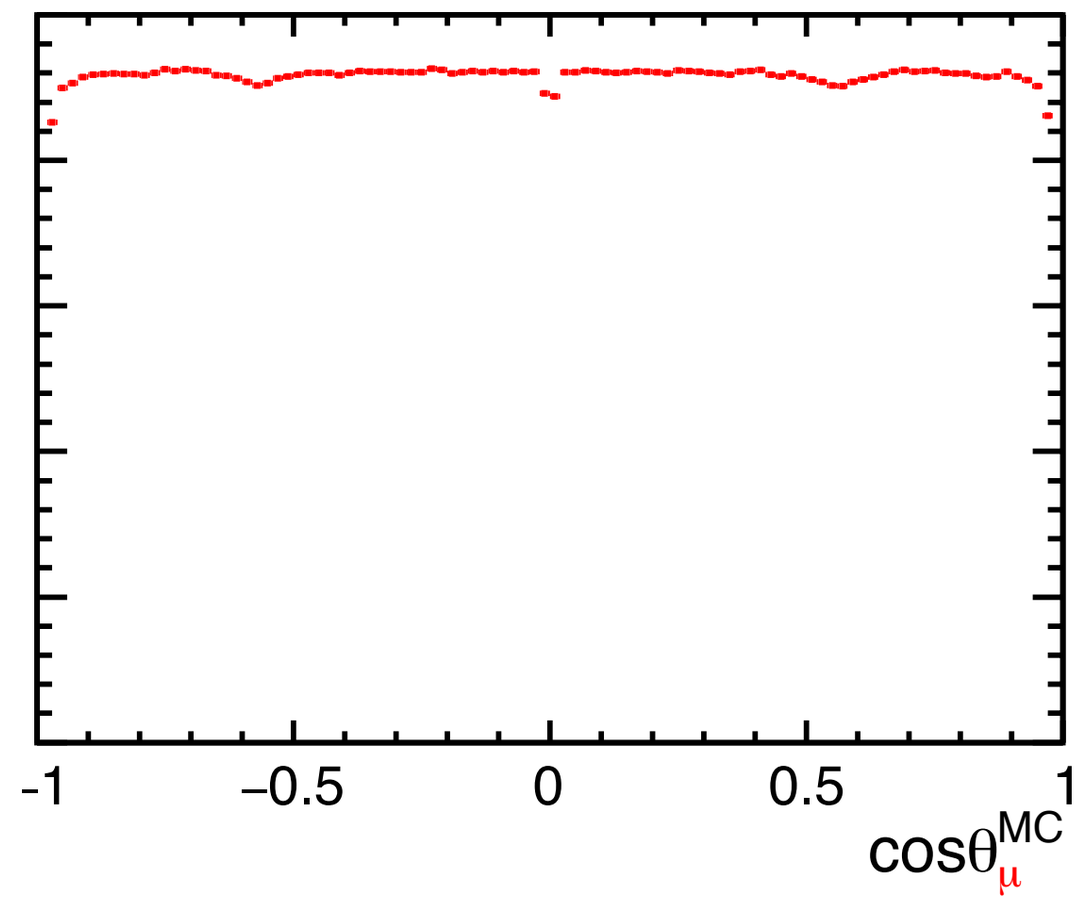
Efficiency versus polar angle

(muon)

New (Large)



DBD

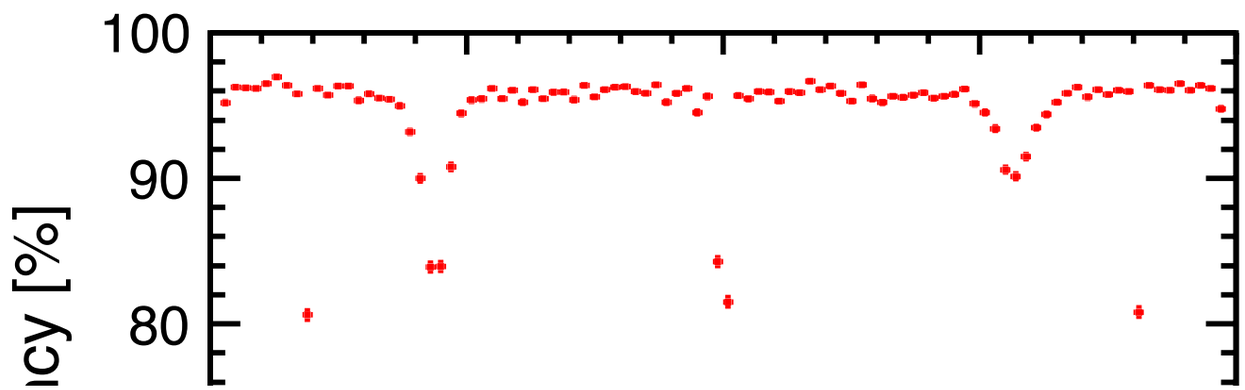


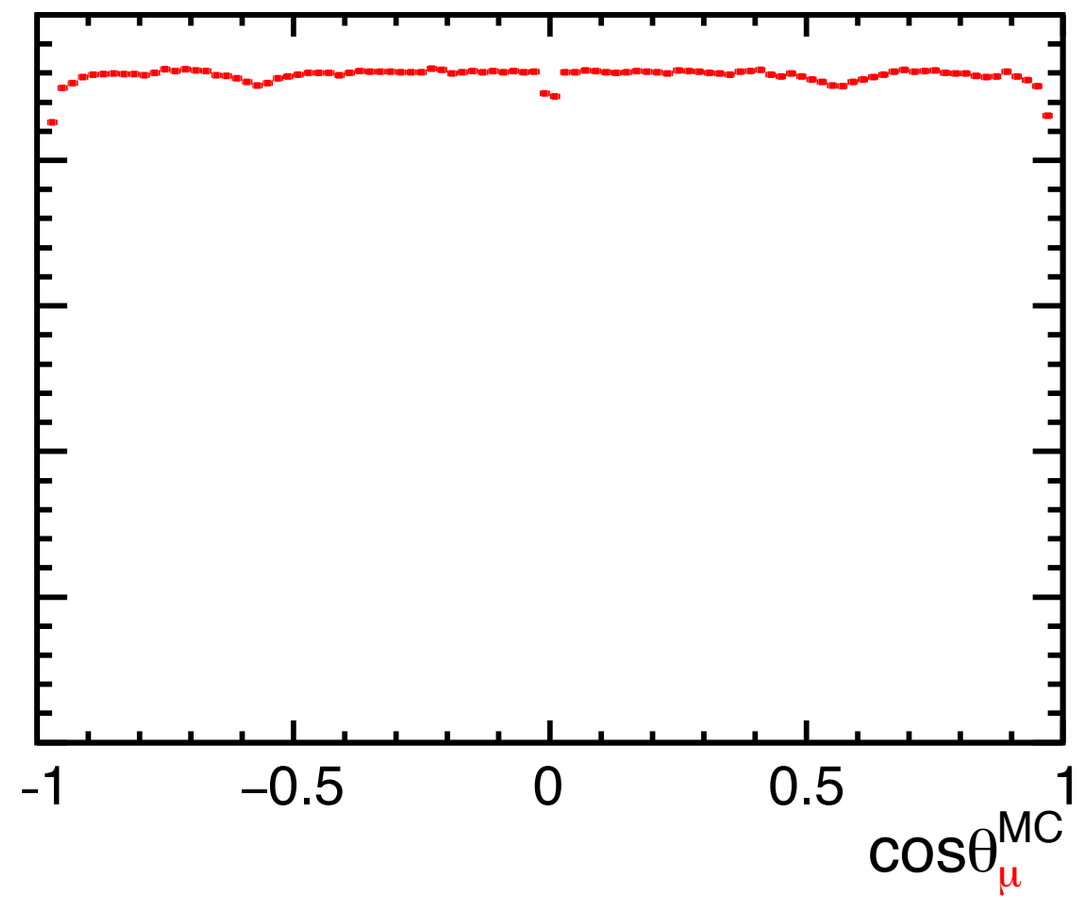
Efficiency versus polar angle

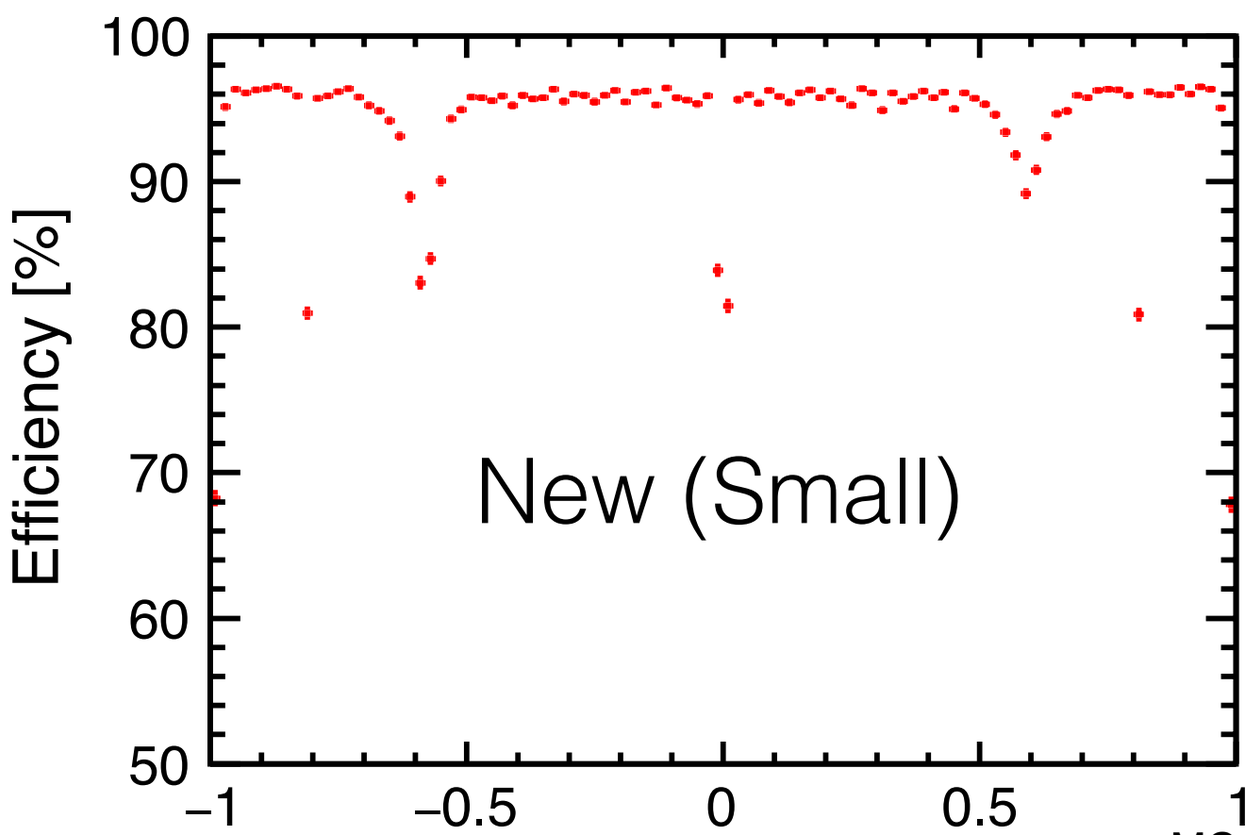
(muon)

New (Large)

DBD

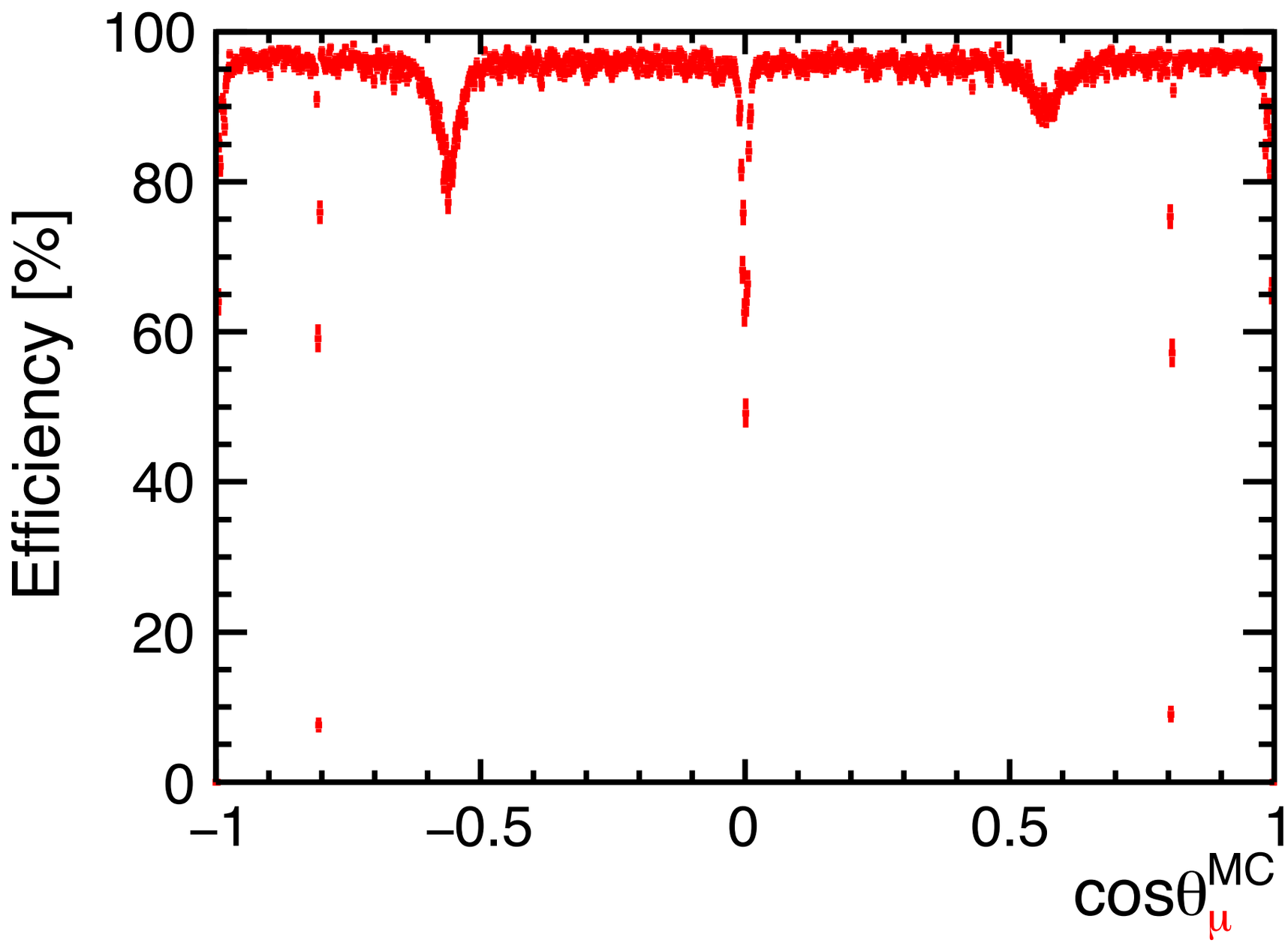






Efficiency deficit in the new samples

(muon)



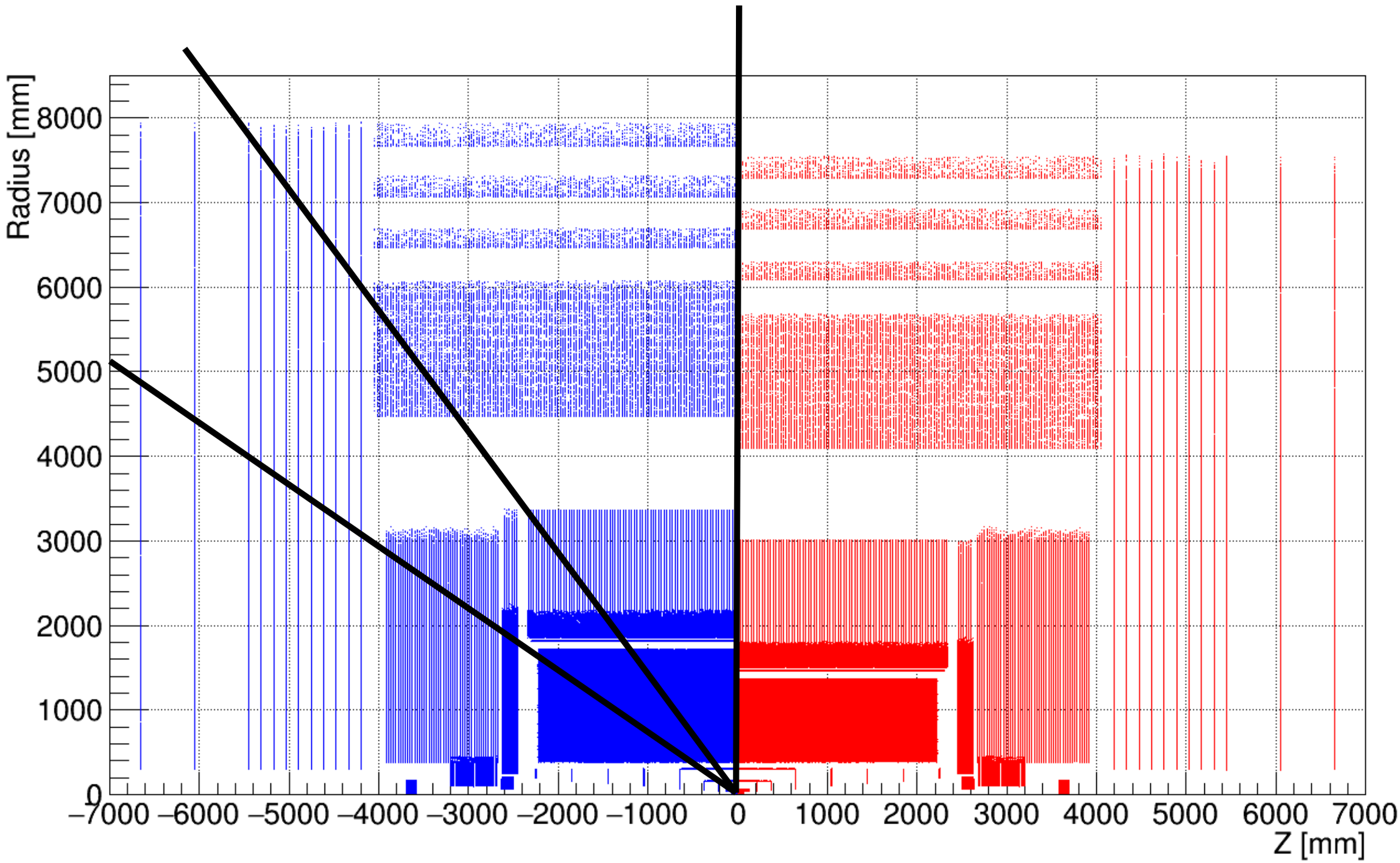
$\theta_1 = 89.5^\circ \pm 0.5^\circ$

$\theta_2 = 36.4^\circ \pm 0.2^\circ$

$\theta_3 = 55^\circ \pm 5^\circ$

(main reason)

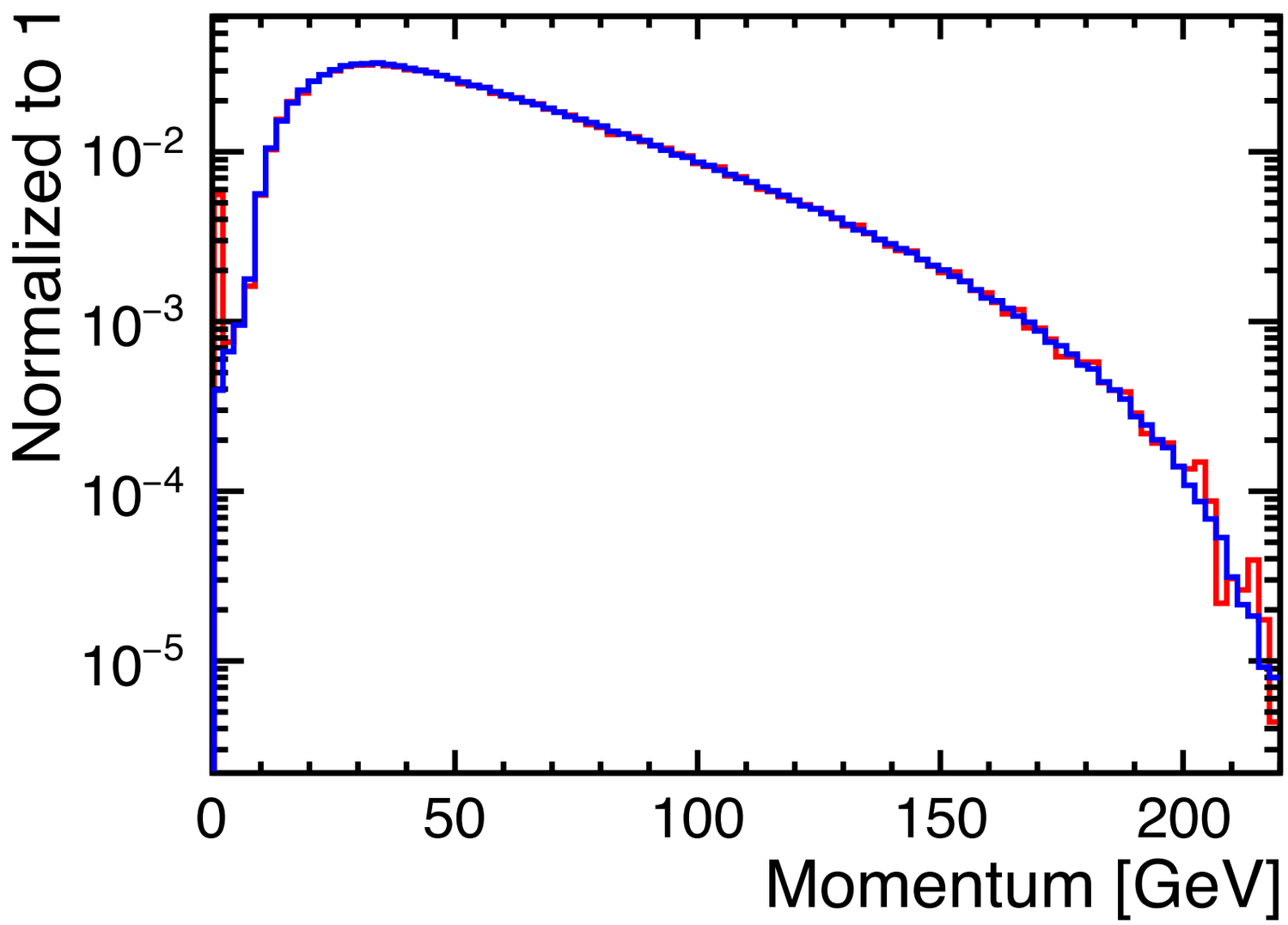
Efficiency deficit in the new samples



detailed comparison (i): momentum

sample: yyxylv

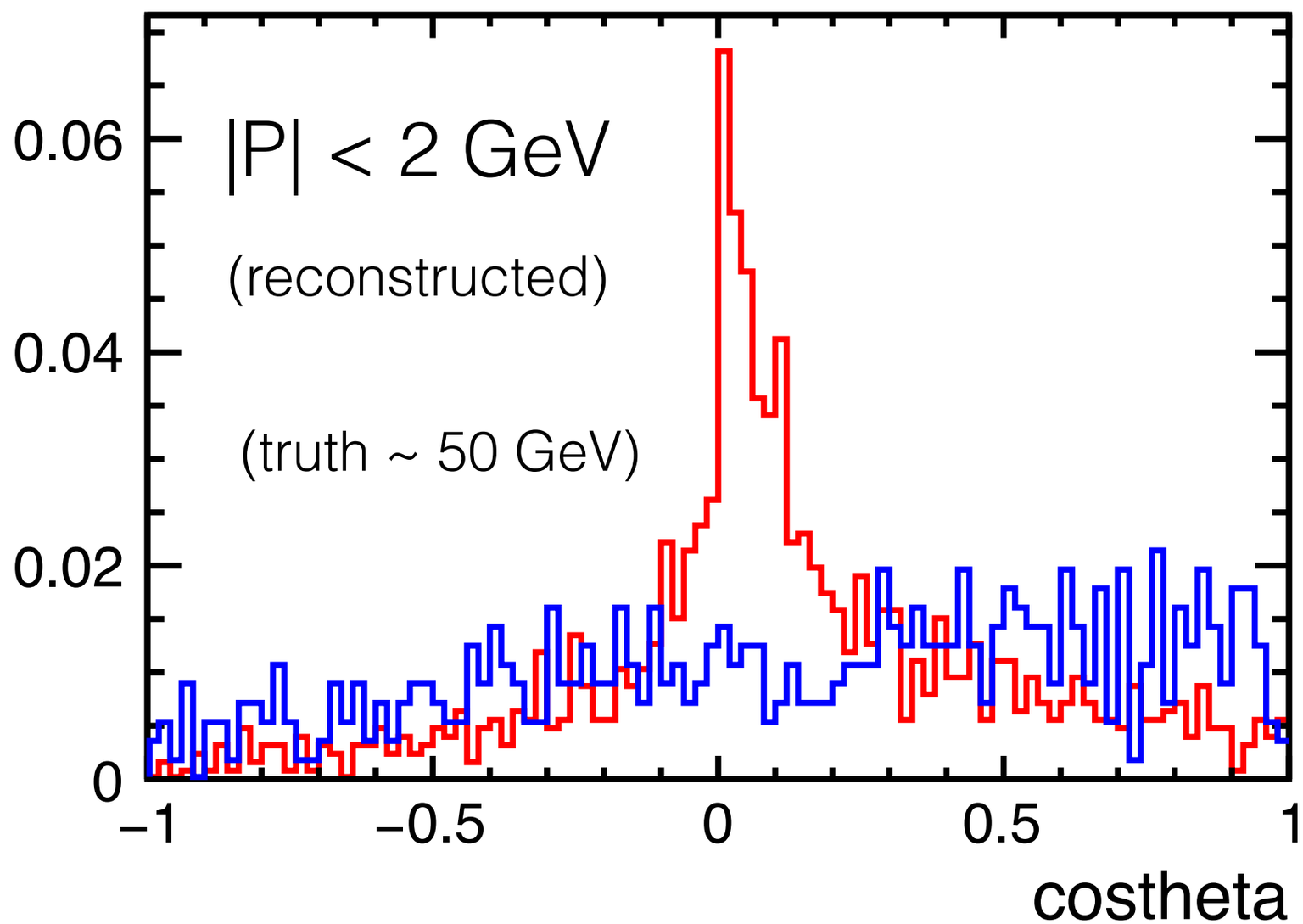
red: new (large)
blue: DBD



peak at ~zero

detailed comparison (i): momentum

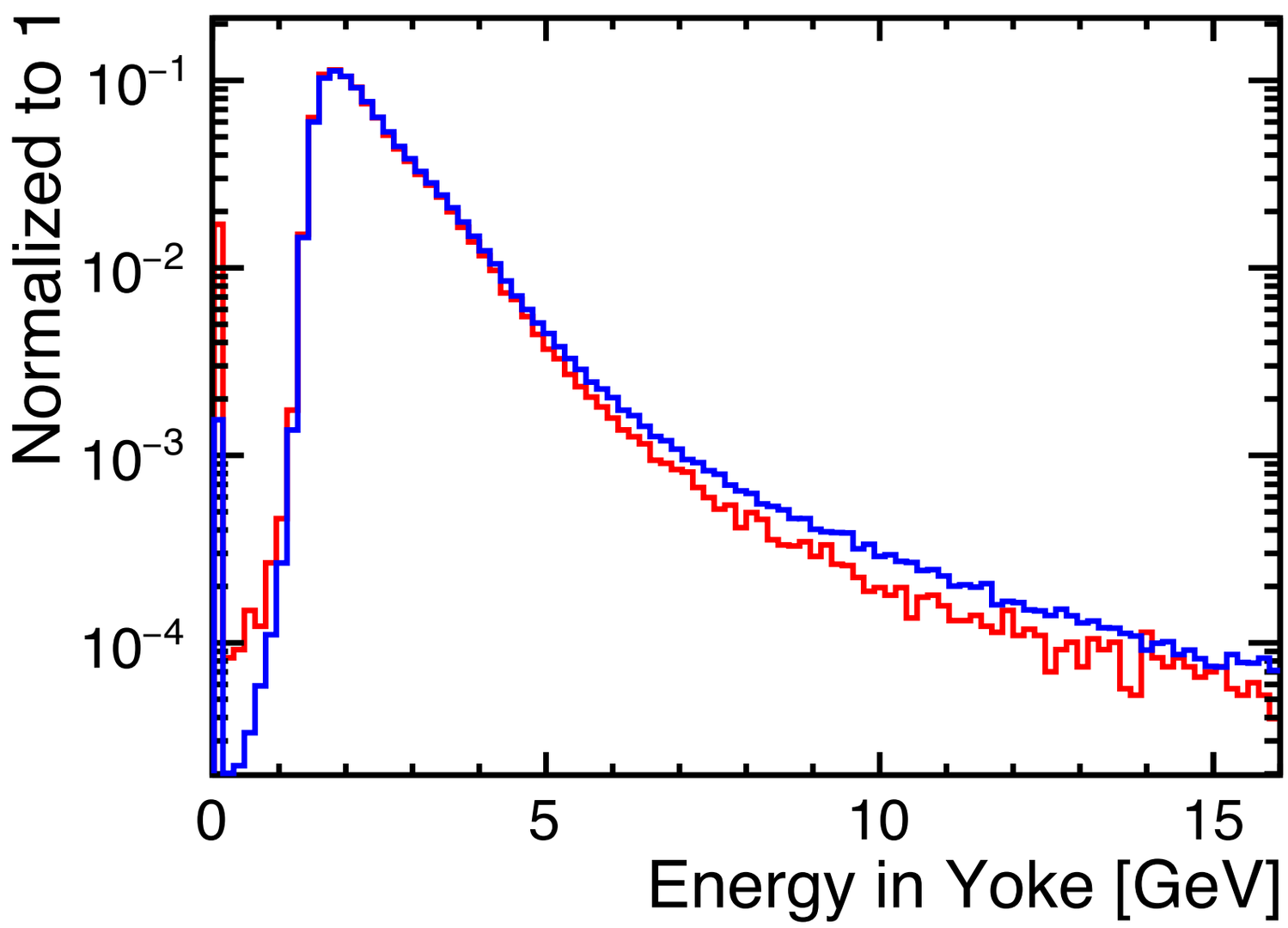
red: new (large)
blue: DBD



change in tracking at around the cathode plane

detailed comparison (ii): Energy deposited in Yoke

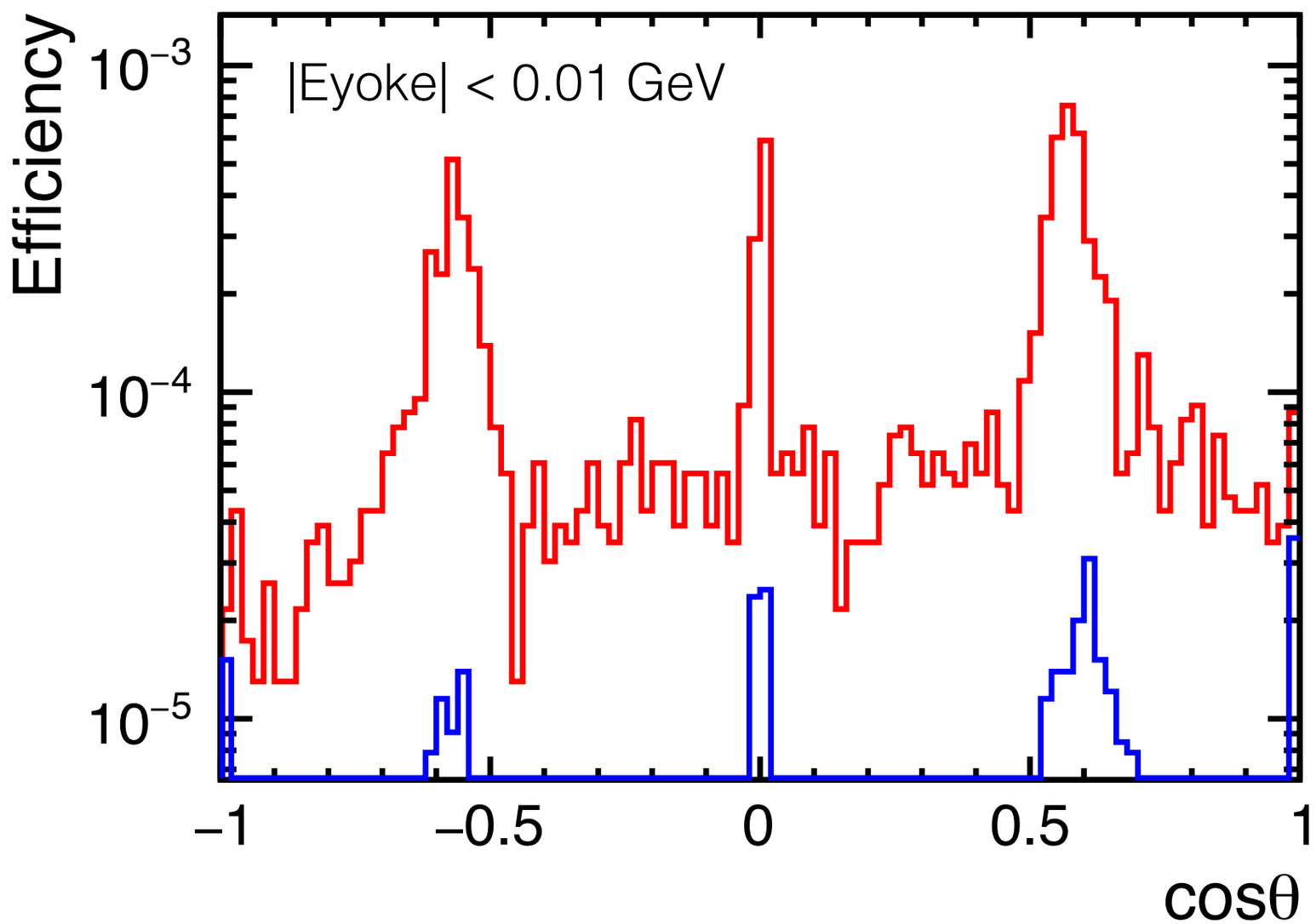
red: new (large)
blue: DBD



peak at ~zero

detailed comparison (ii)

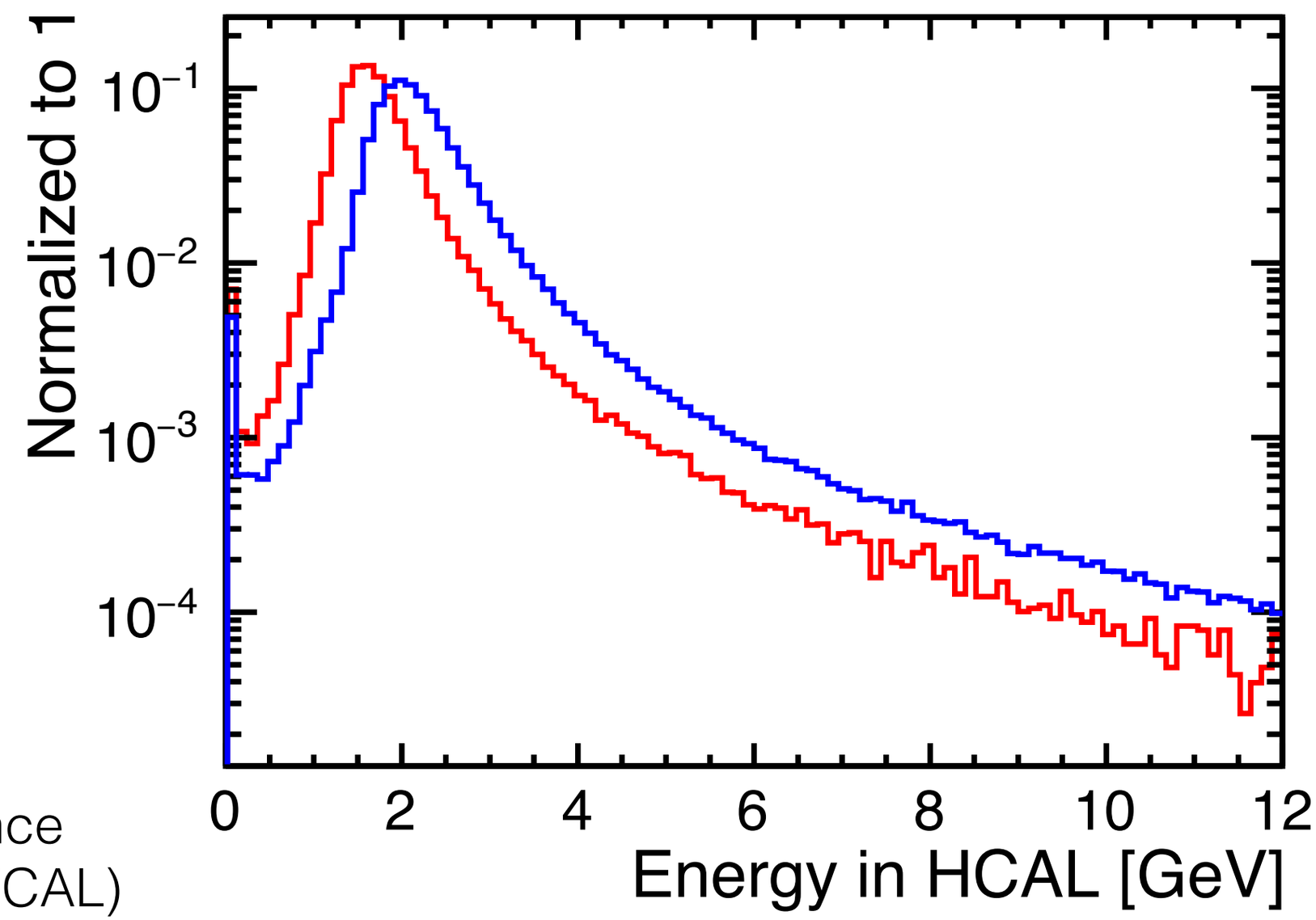
red: new (large)
blue: DBD



change in simulation at Yoke or
mis-match between track and cluster by PFA?

detailed comparison (iii): Energy in HCAL

red: new (large)
blue: DBD



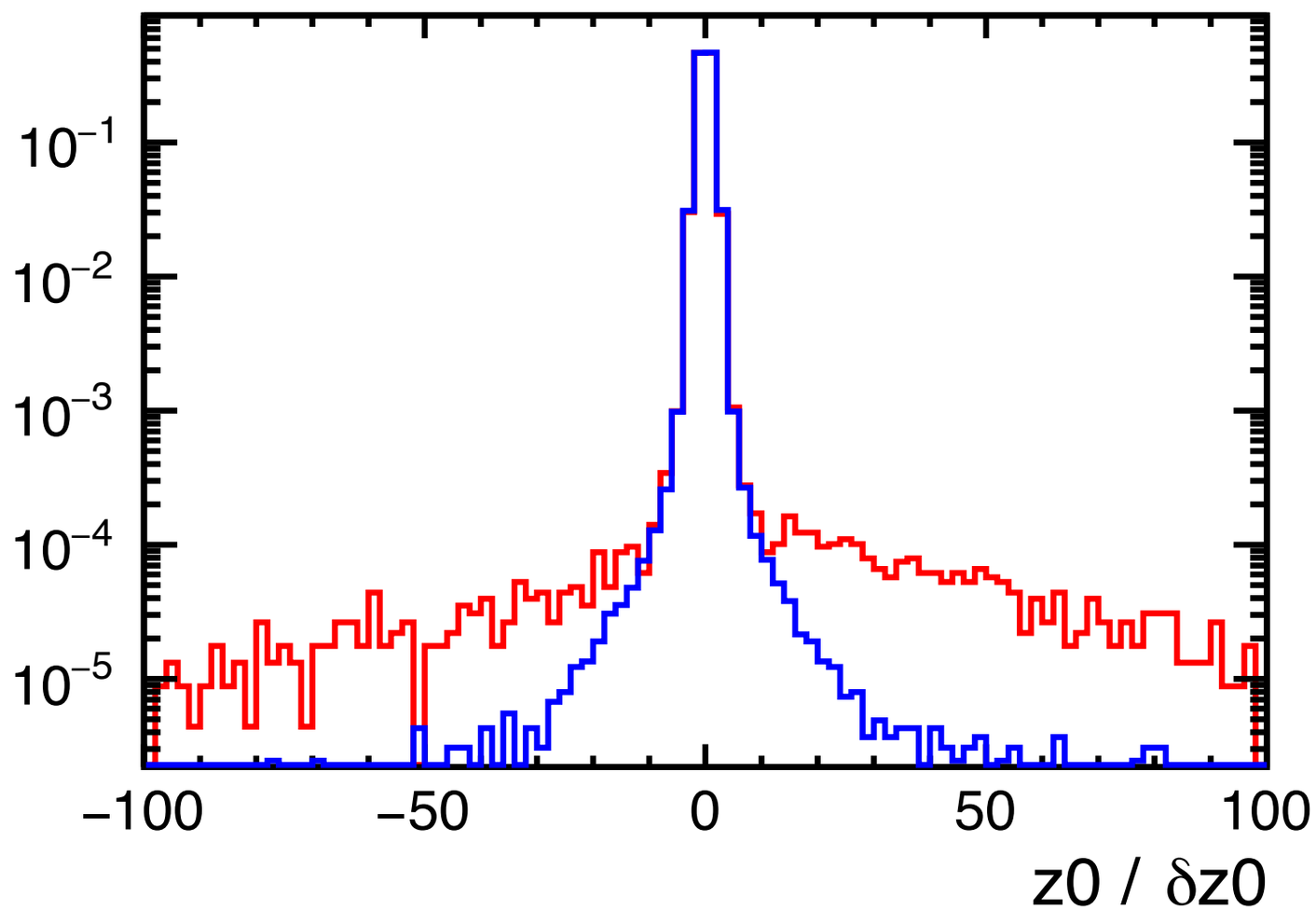
(not affecting performance)

(no difference observed in ECAL)

change in MIP or thickness?

detailed comparison (iv): impact parameter

red: new (large)
blue: DBD



(not affecting much performance)

z0 is defined w.r.t. MC Truth IP