

# EIC Particle Identification in Heavy Flavor Study

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with help & inputs from LBNL memebbers, Jin Huang  
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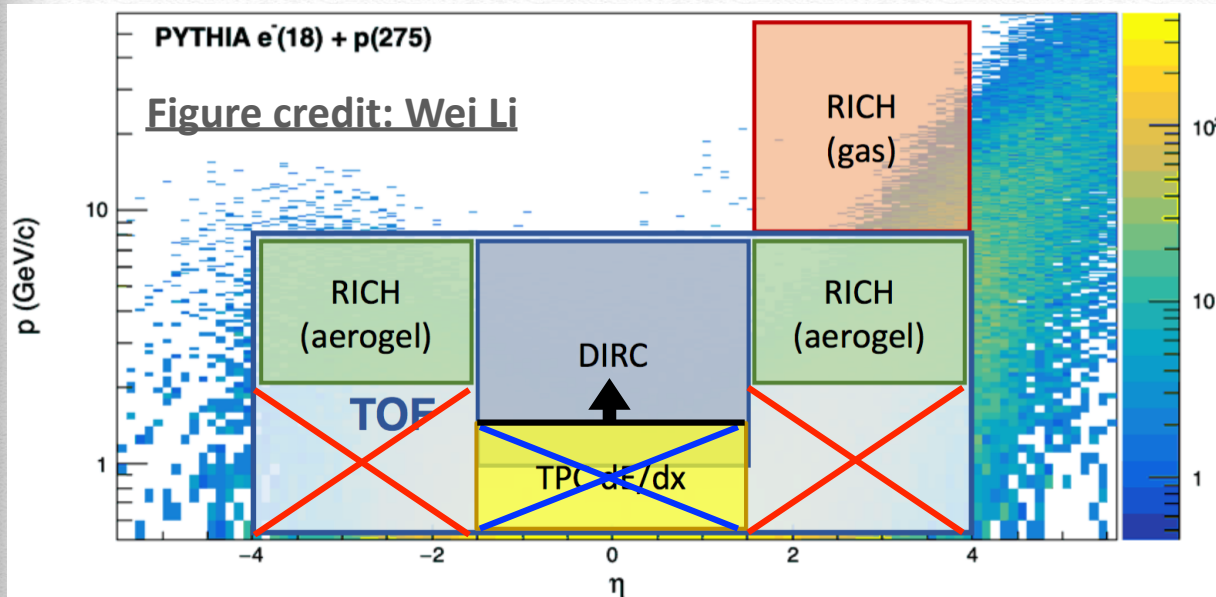
# Low $p$ threshold for RICH detectors

EICUG YR

Detector Matrix	
Barrel	< 6 GeV
Forward	< 10 GeV
Backward	< 50 GeV

radiator	index	Threshold (GeV/c)			
		e	$\pi$	K	p
quartz (DIRC)	1.473	0.00048	0.13	0.47	0.88
aerogel (mRICH)	1.03	0.00207	0.57	2.00	3.80
aerogel (dRICH)	1.02	0.00245	0.69	2.46	4.67
C <sub>2</sub> F <sub>6</sub> (dRICH)	1.0008	0.01277	3.49	12.34	23.45
CF <sub>4</sub> (gRICH)	1.00056	0.01527	4.17	14.75	28.03

Table 11.23: Table of Cherenkov thresholds for various media.

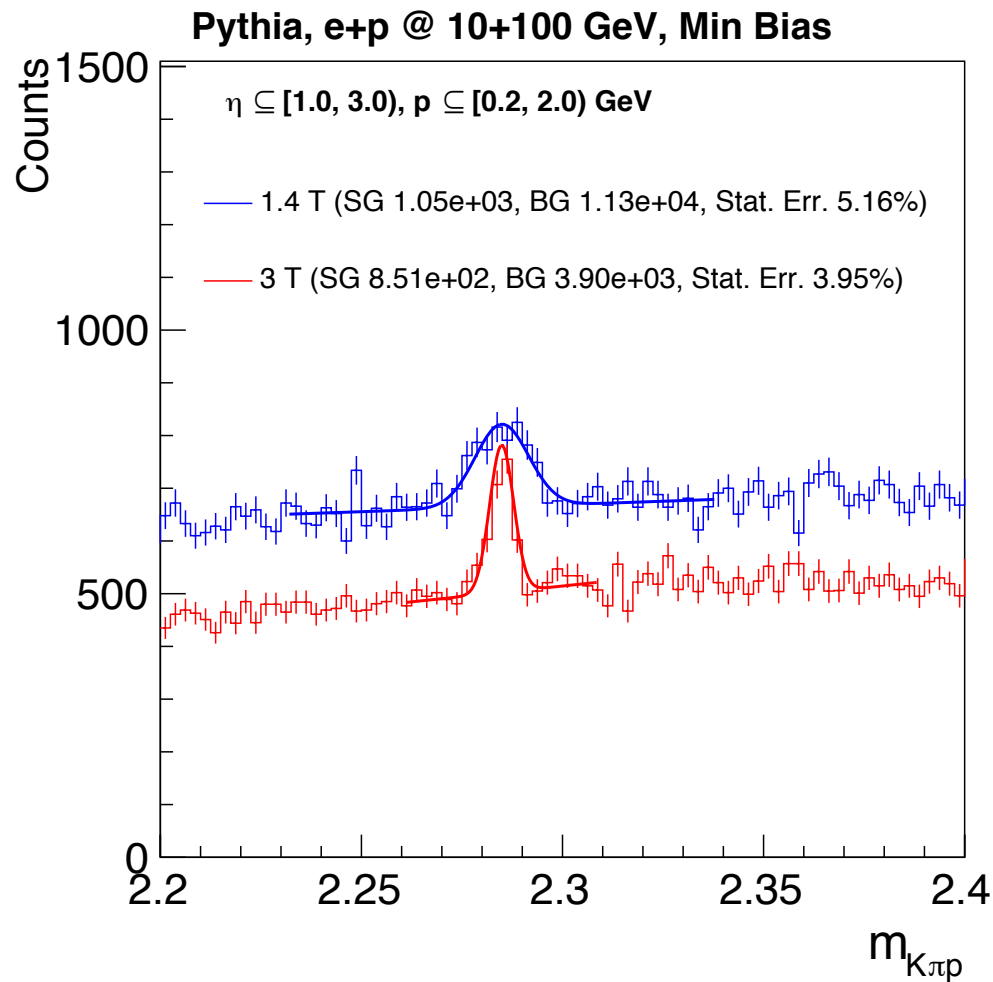


**No TOF in current Beast  
or EIC-sPHENIX**

**No dE/dx in All-Si  
concept**

**Magnetic field can  
affect the low  $p_T$  range**

# Effect of magnetic field

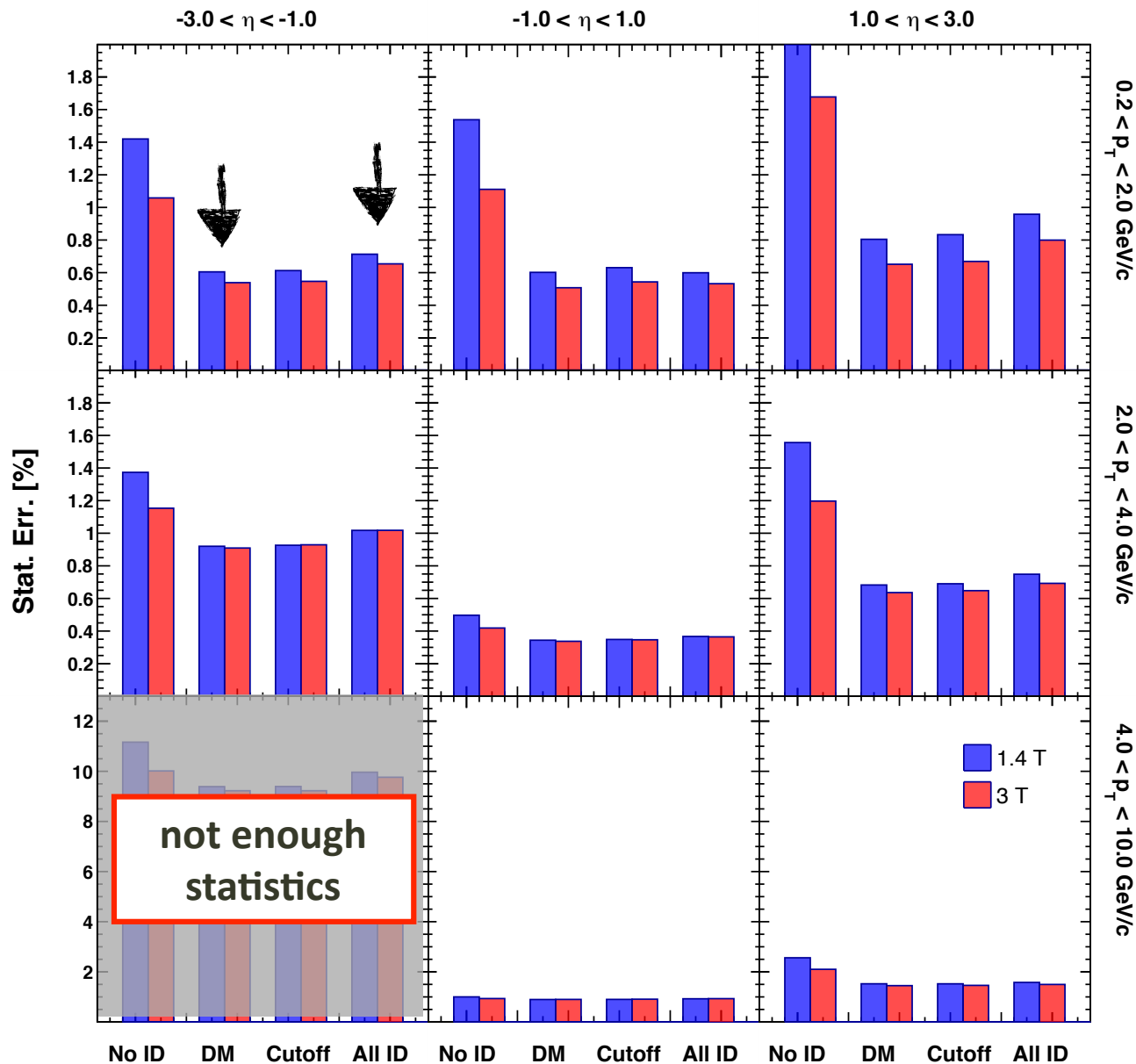


## 1.4T to 3T

- **SG drops because of the acceptance**
- **BG drops because of a better momentum resolution (narrower signal region) and fewer low  $p_T$  tracks**

# D<sup>0</sup>

Pythia, e+p @ 10+100 GeV, Min Bias



Low p cutoff using DIRC+dRICH as PID does not affect D<sup>0</sup> significantly

Larger effect at |η| > 1

larger effect at low p<sub>T</sub>

3T has slightly better precision comparing to 1.4T

Thanks!