

Background Studies for DY at PANDA

The Turin Muon Group

- layout studies for muon id with ABDYG (1.5 MEV)
- background studies with PYTHIA (640 KEV)
- porting MISS in PANDAROOT
- extensive simulations needed in PANDAGRID

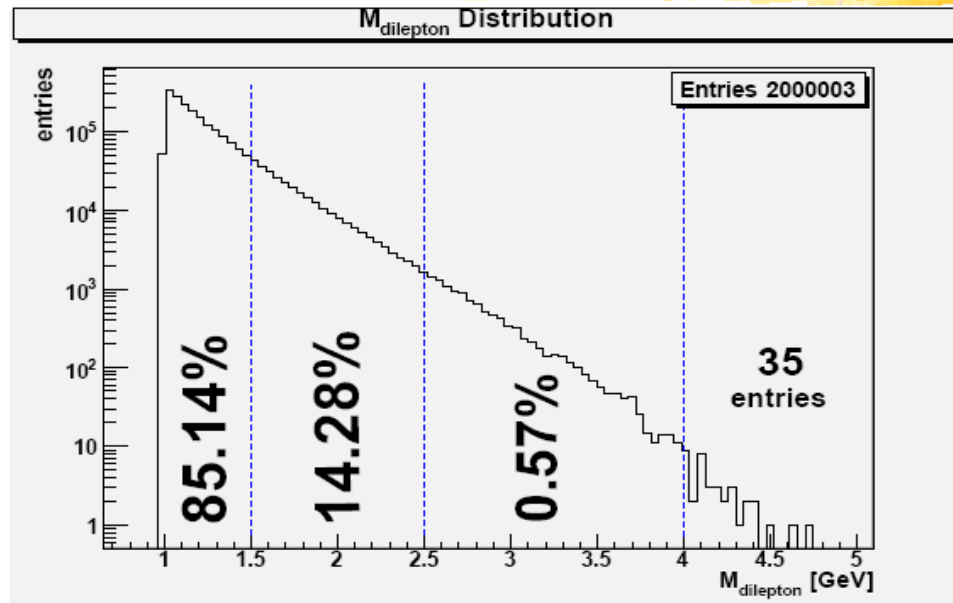


March 17, 2008

M.Maggiara - Perspective for Polarisation in PANDA



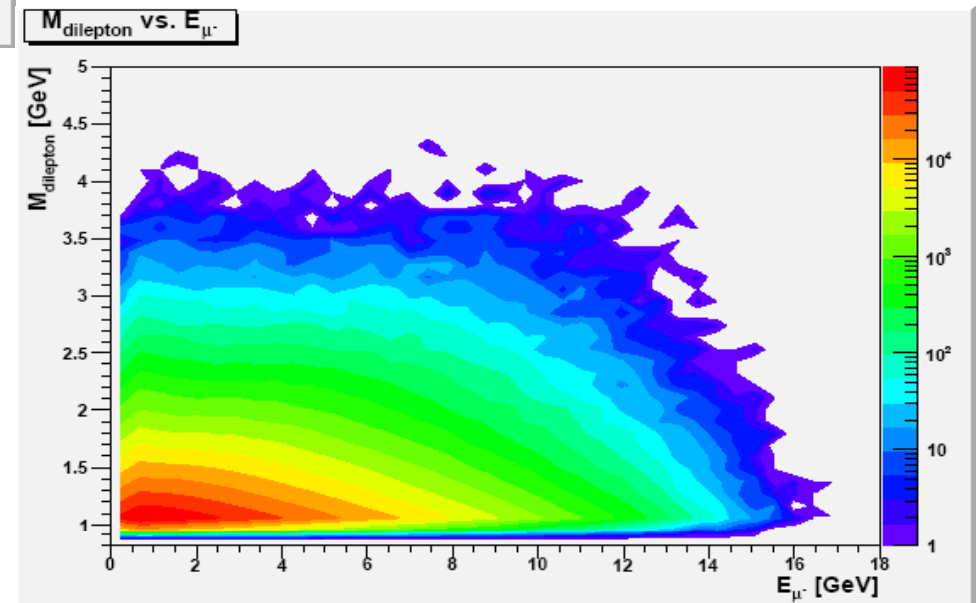
Benchmark channel: DY @ 14 GeV/c — $\bar{p}p \rightarrow \mu^+ \mu^- X$



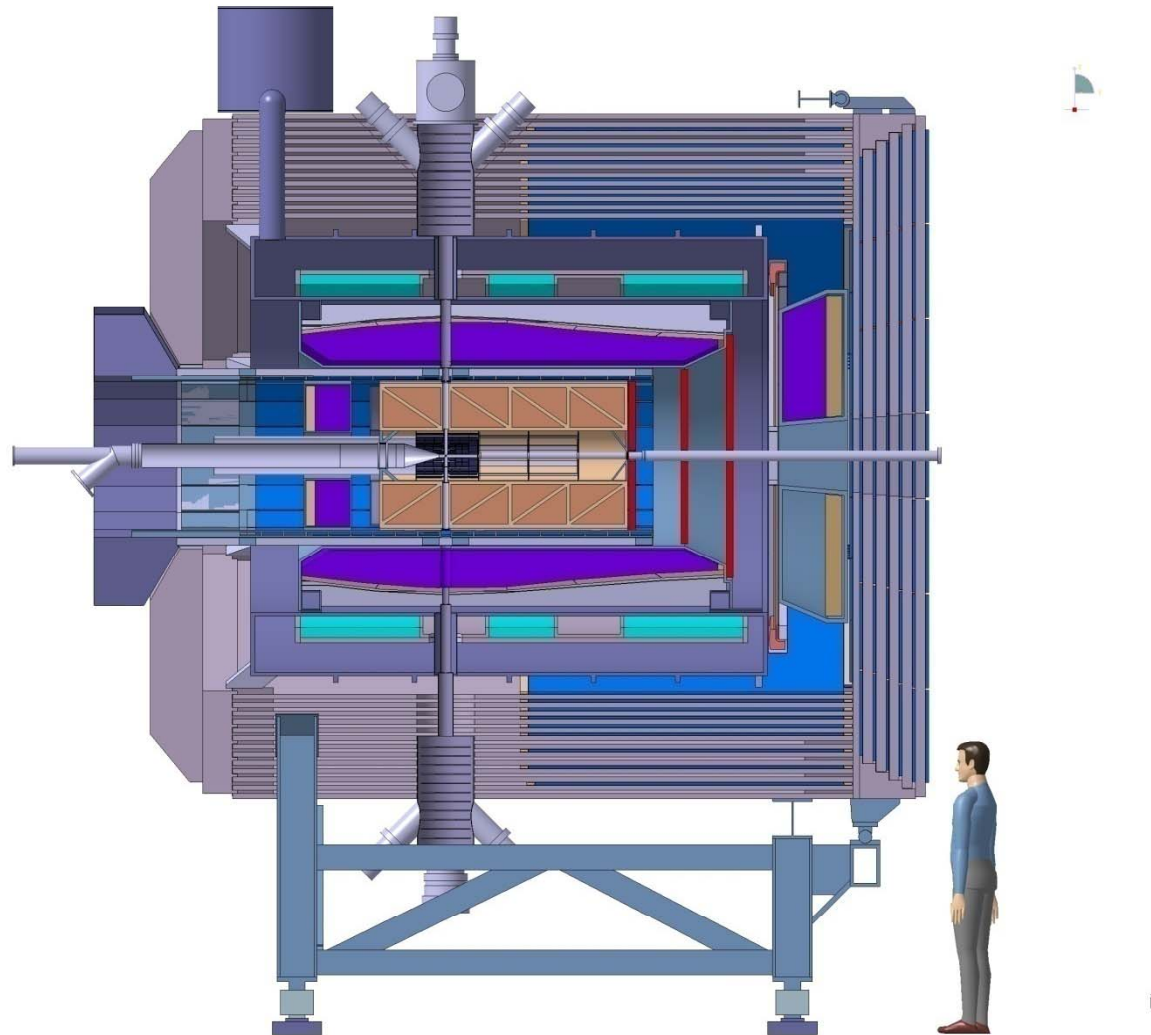
$\sqrt{s} = 5.5 \text{ GeV} !!!$

Focus on one single M_{μμ} range

$$1.5 < M_{\mu\mu} < 2.5 \text{ GeV}$$

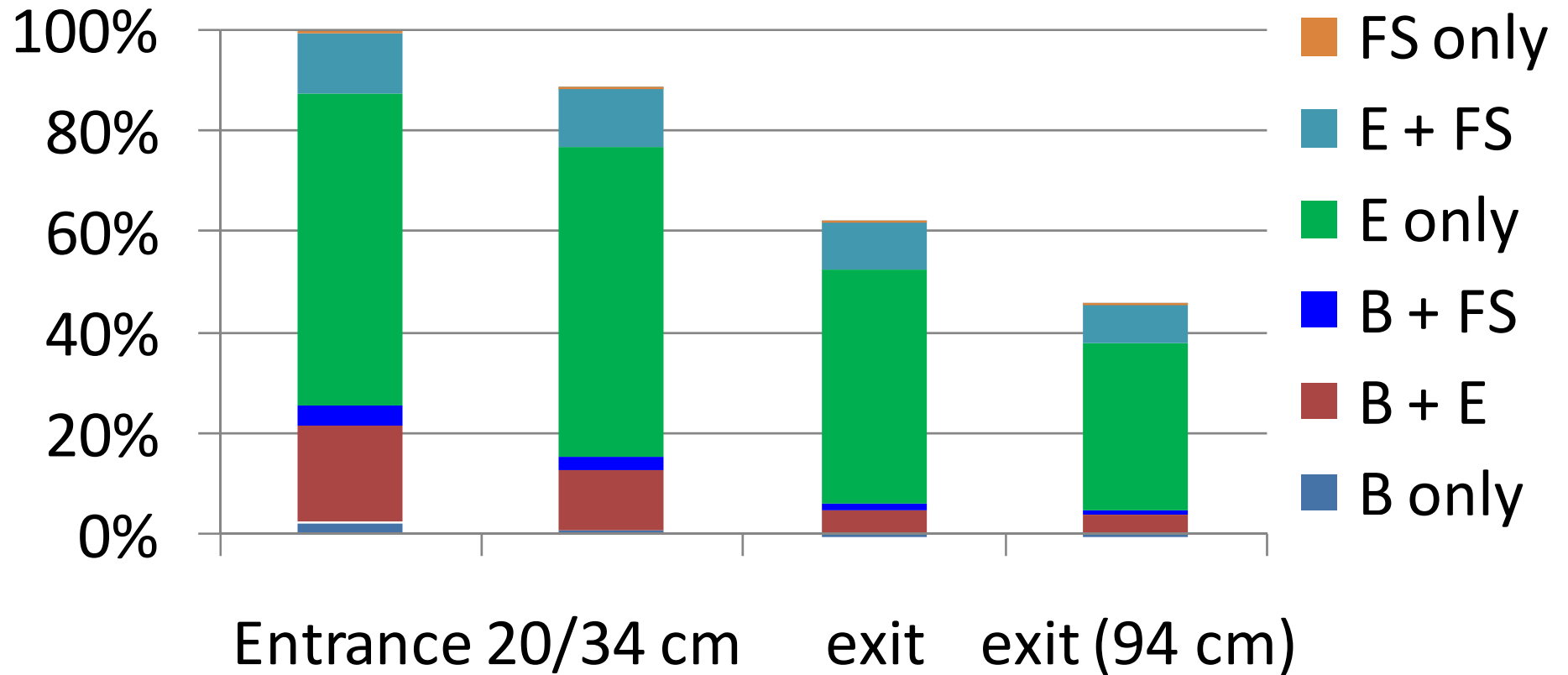


New BARREL and ENDCAP geometry

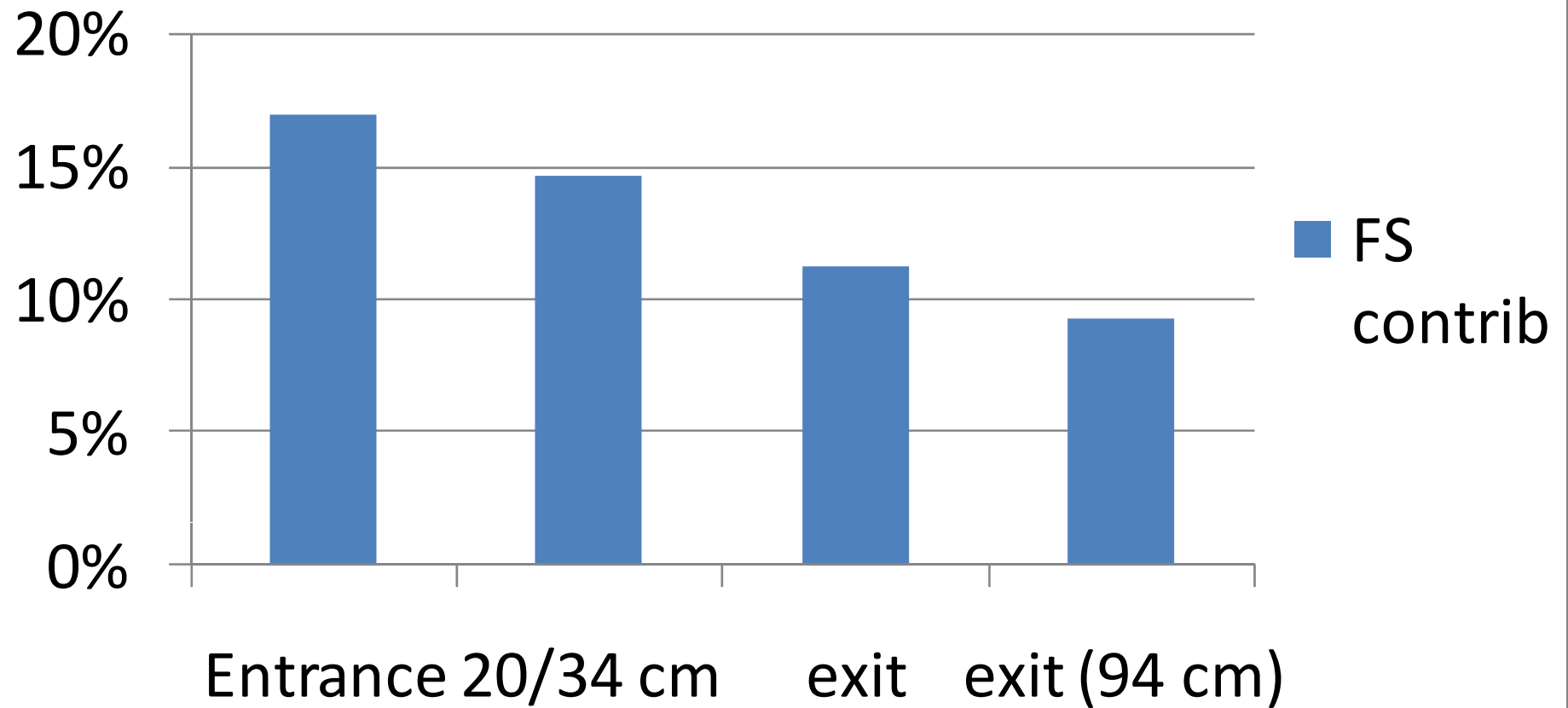


Background: full PYTHIA simulation at maximum energy

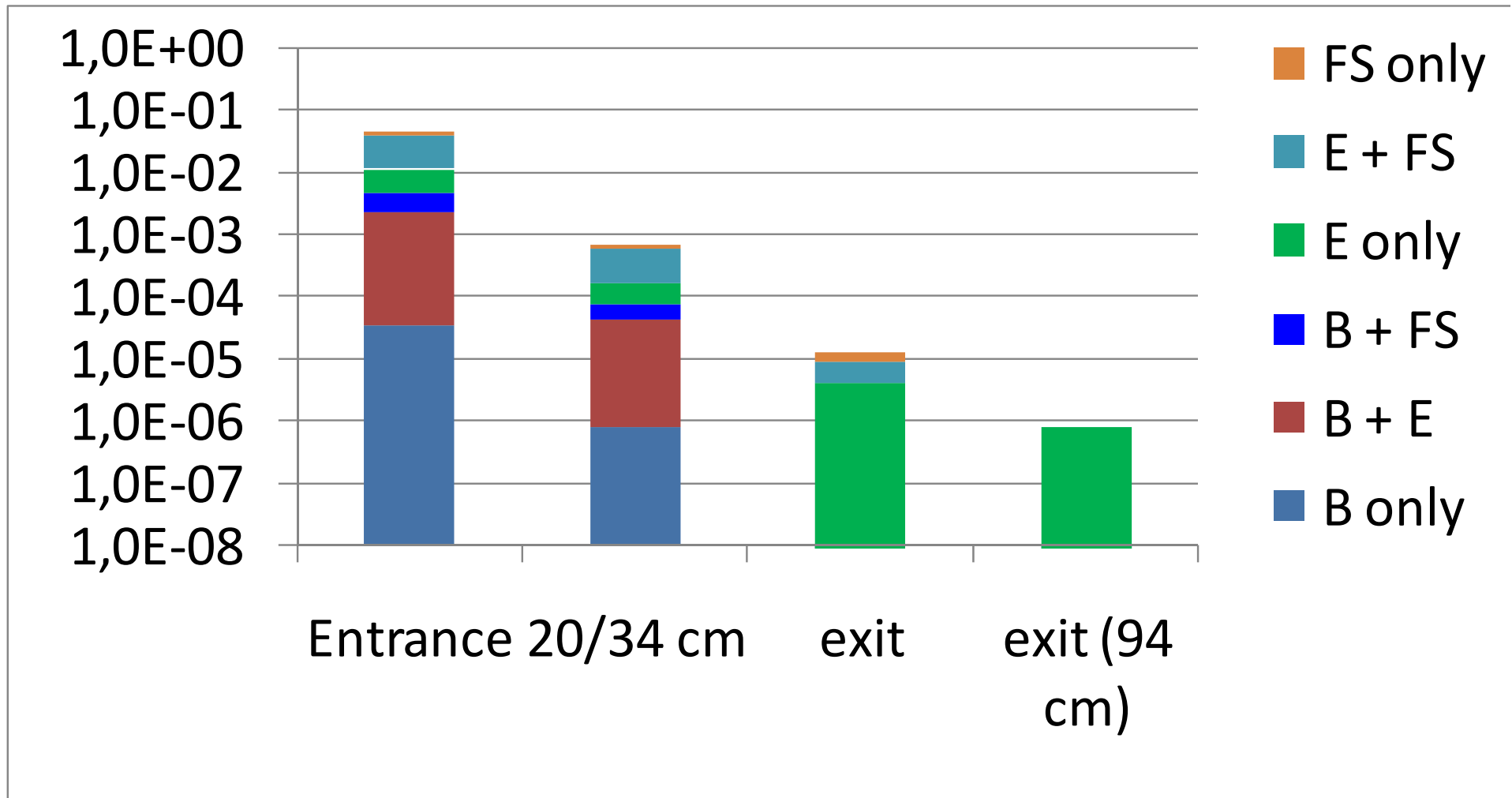
ABDYG signal distribution



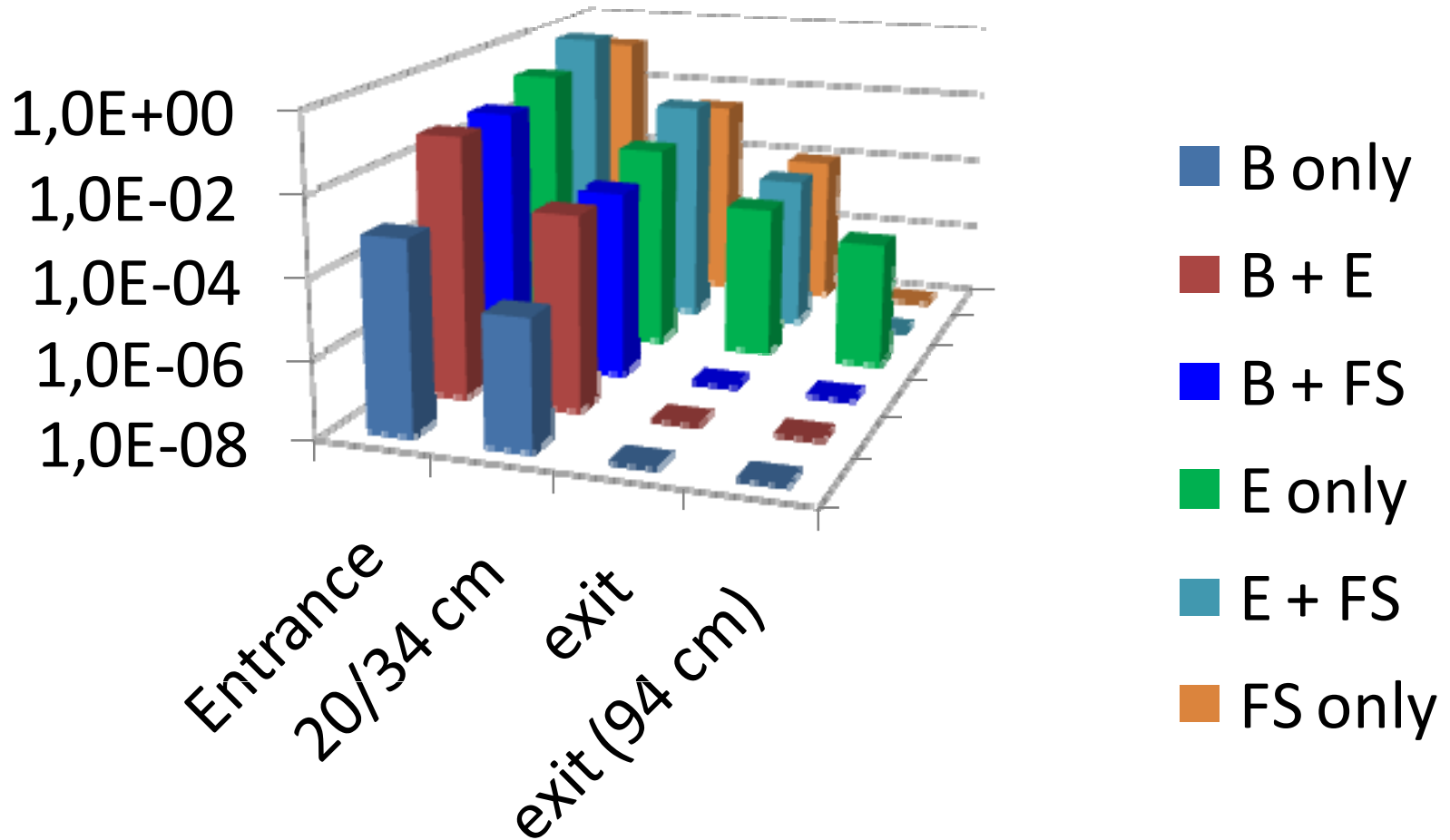
ABDYG signal FS contribution



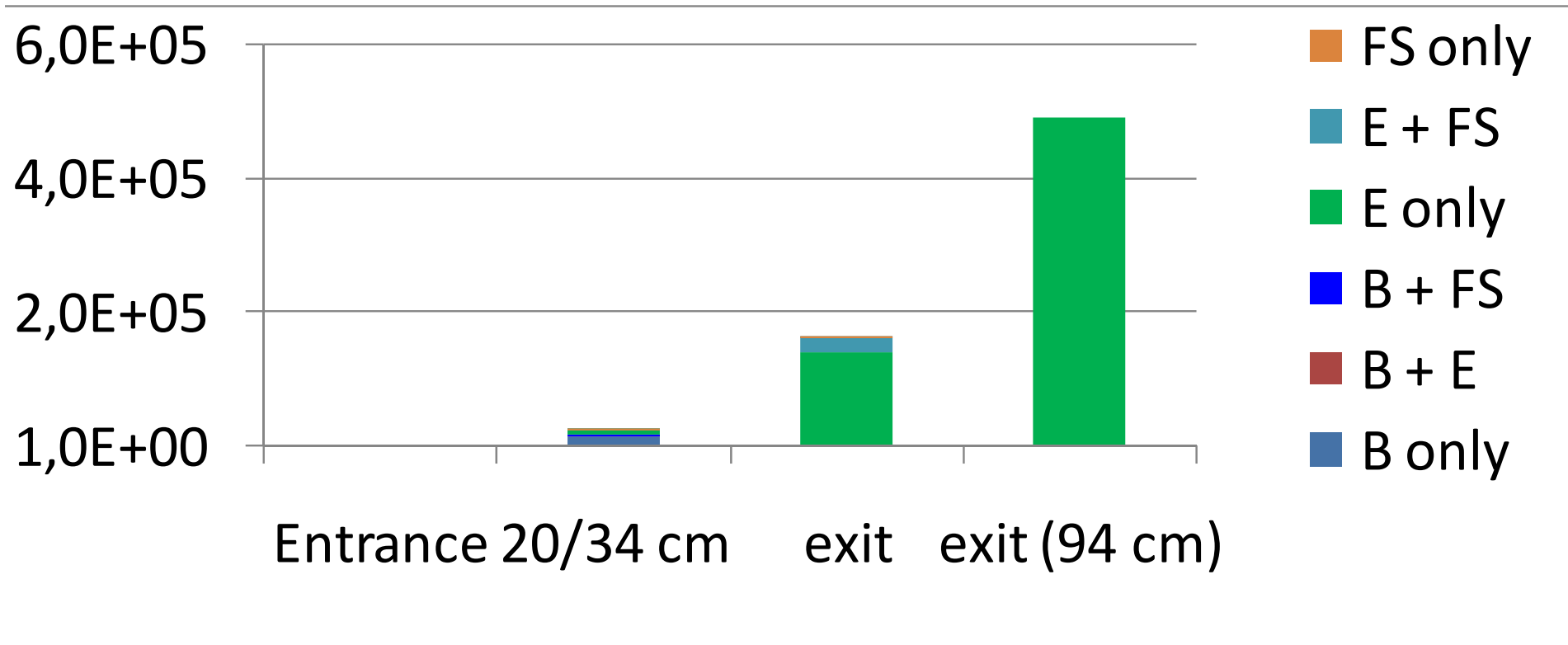
Hadronic background distribution



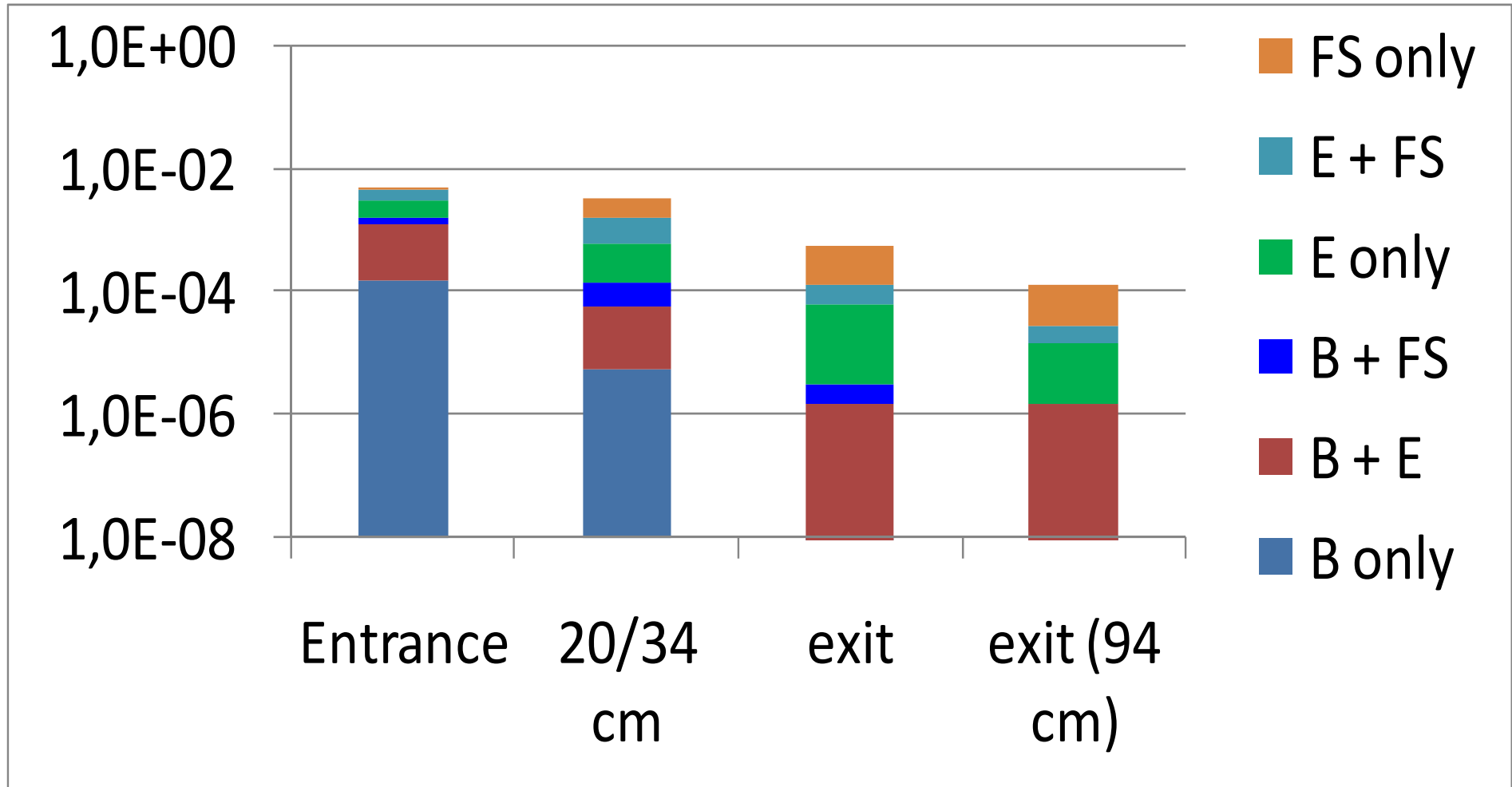
Hadronic background rejection in Fe



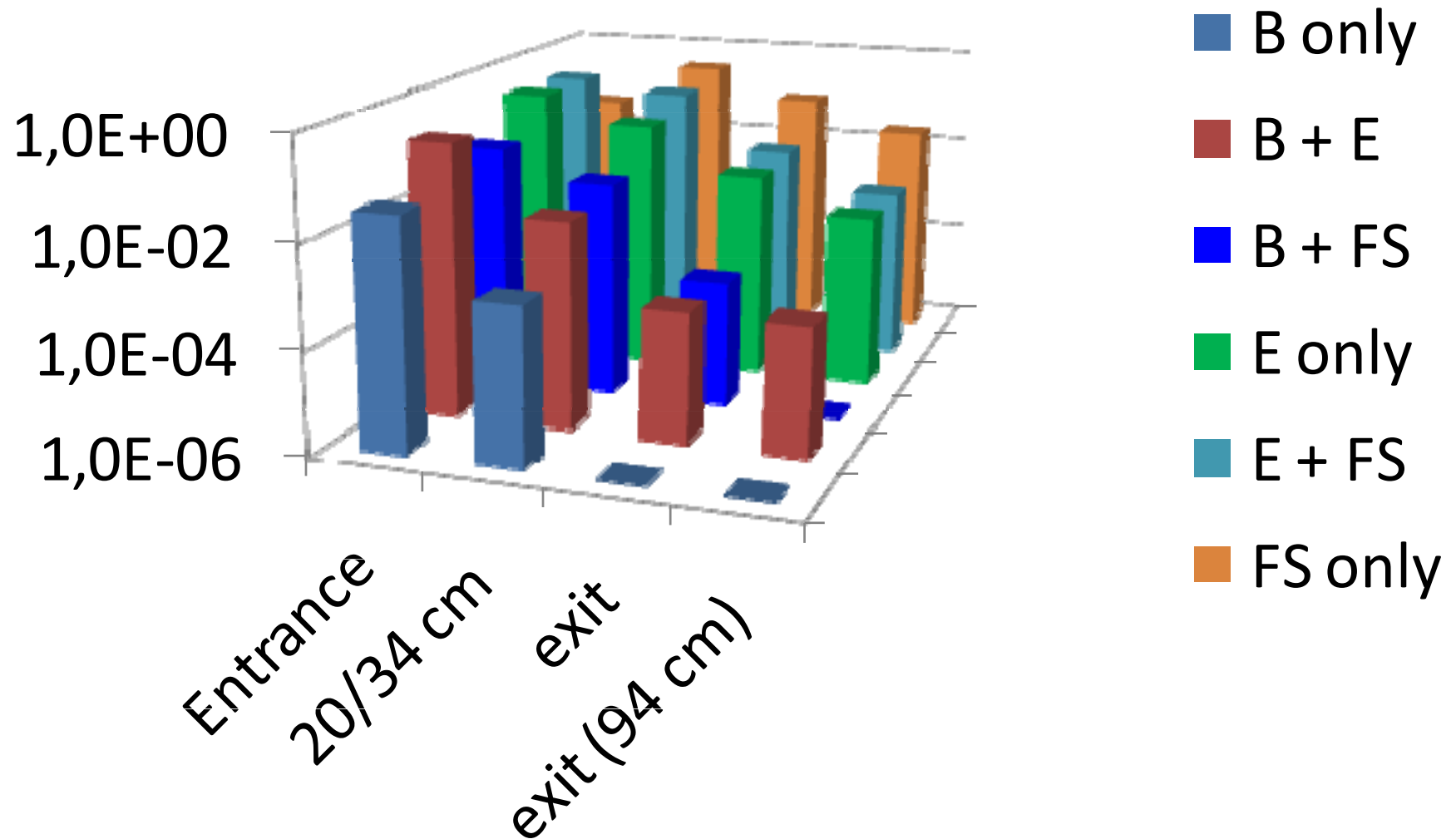
Signal/(primary) background ratio



Hadronic secondary background distribution



Hadronic secondary background Fe rejections



Conclusions

MORE EXTENDED SIMULATIONS ARE NEEDED

- Barrel rejection factor per track: $5 \cdot 10^3$
- Endcap rejection factor per track: 10^2 ($5 \cdot 10^2$ after 94 cm)
- Barrel rejection factor considering couples: $> 10^6$ (40cm Fe)
- Endcap rejection factor considering couples: $1.5 \cdot 10^5$ (after 64cm of Fe; 30cm more lead to $5 \cdot 10^5$ only)

These rejection factor includes primary pions and secondary muons from primary pions..

One order of magnitude is missing; extensive simulations needed on PANDAGRID to design topological and kinematic cuts!

➔ further selection to reject secondary pions and their decay muons