KaonLT Analysis Update

(Pi-Delta BSA Analysis)

Ali Usman

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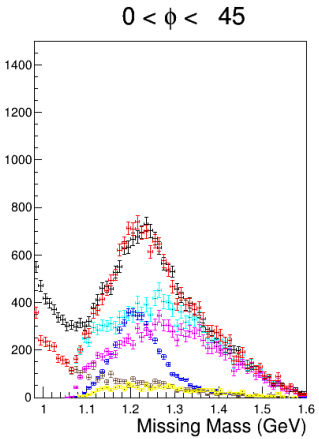
University of Regina

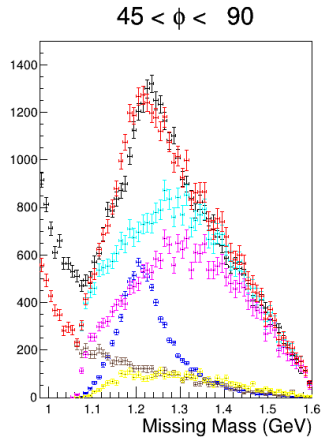
Kinematics

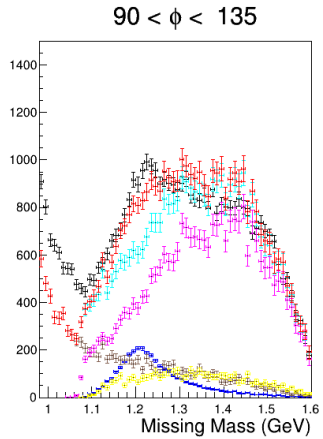
- The correction to HMS delta is not needed for 3 out of 5 kinematics.
- Started the MM shape study for these three settings.

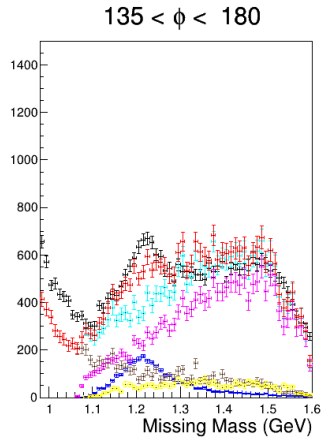
E (GeV)	Q^2 (GeV^2)	W (GeV)	x_B
10.6	5.5	3.02	0.40
10.6	4.4	2.74	0.40
10.6	3.0	3.14	0.25
10.6	3.0	2.32	0.40
10.6	2.115	2.95	0.21

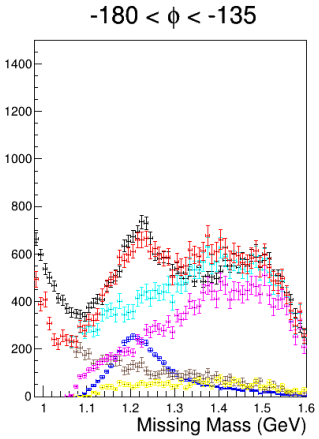
Missing Mass Shape Study

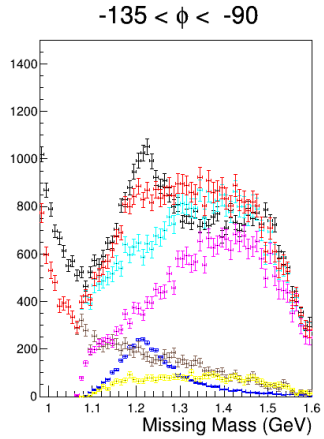


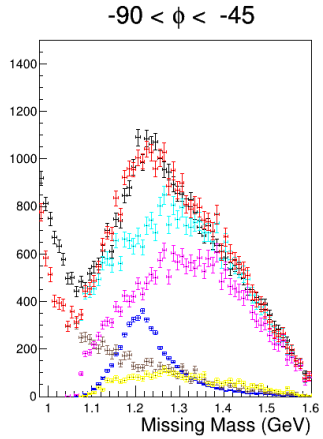


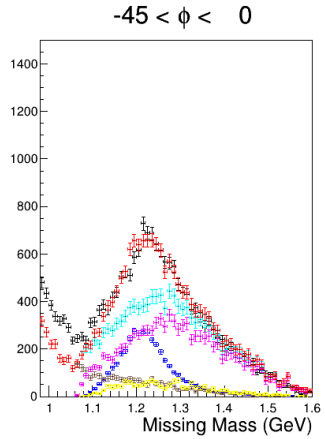


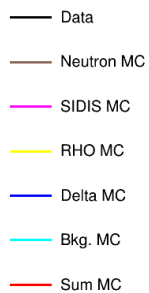




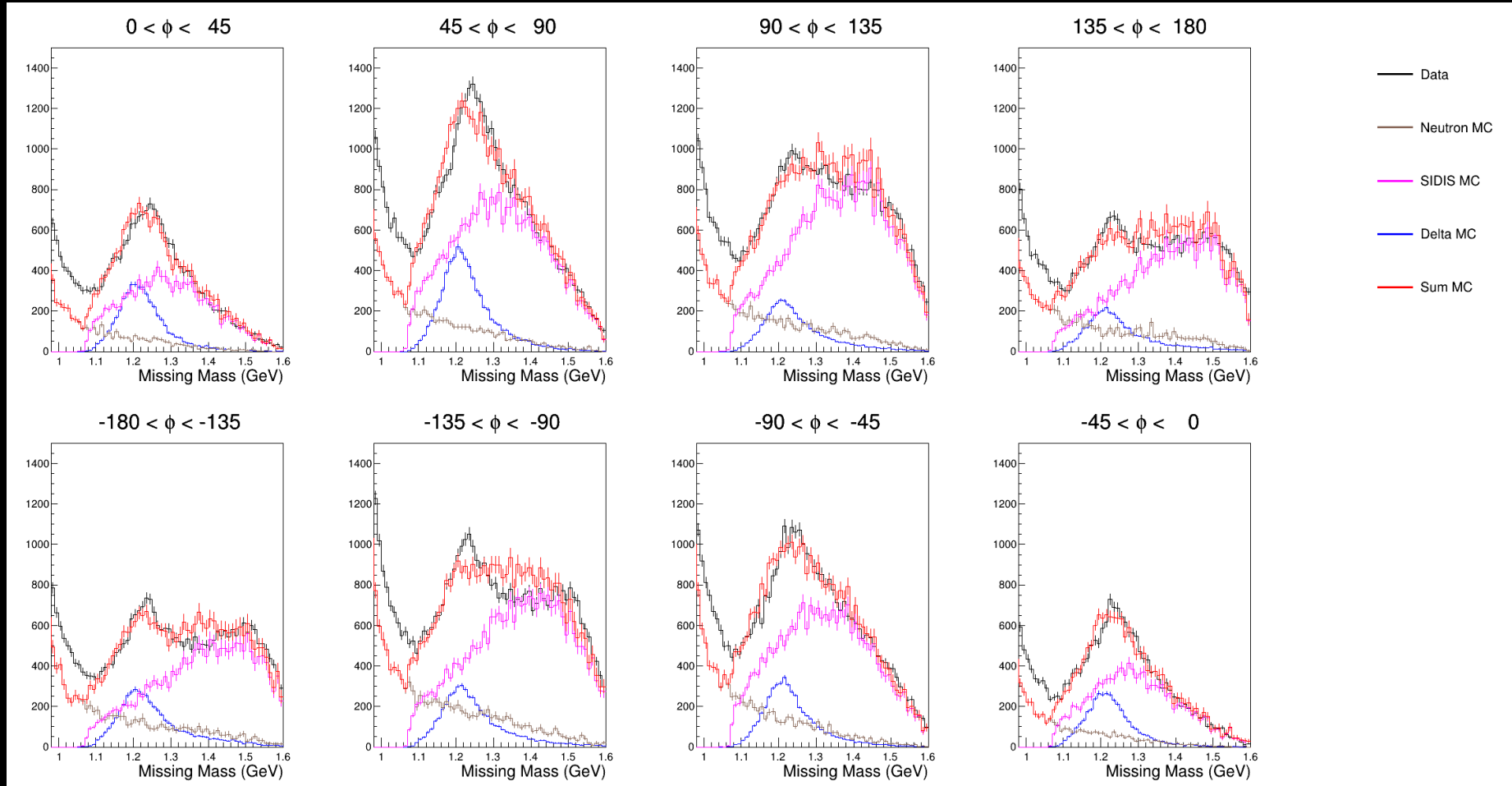




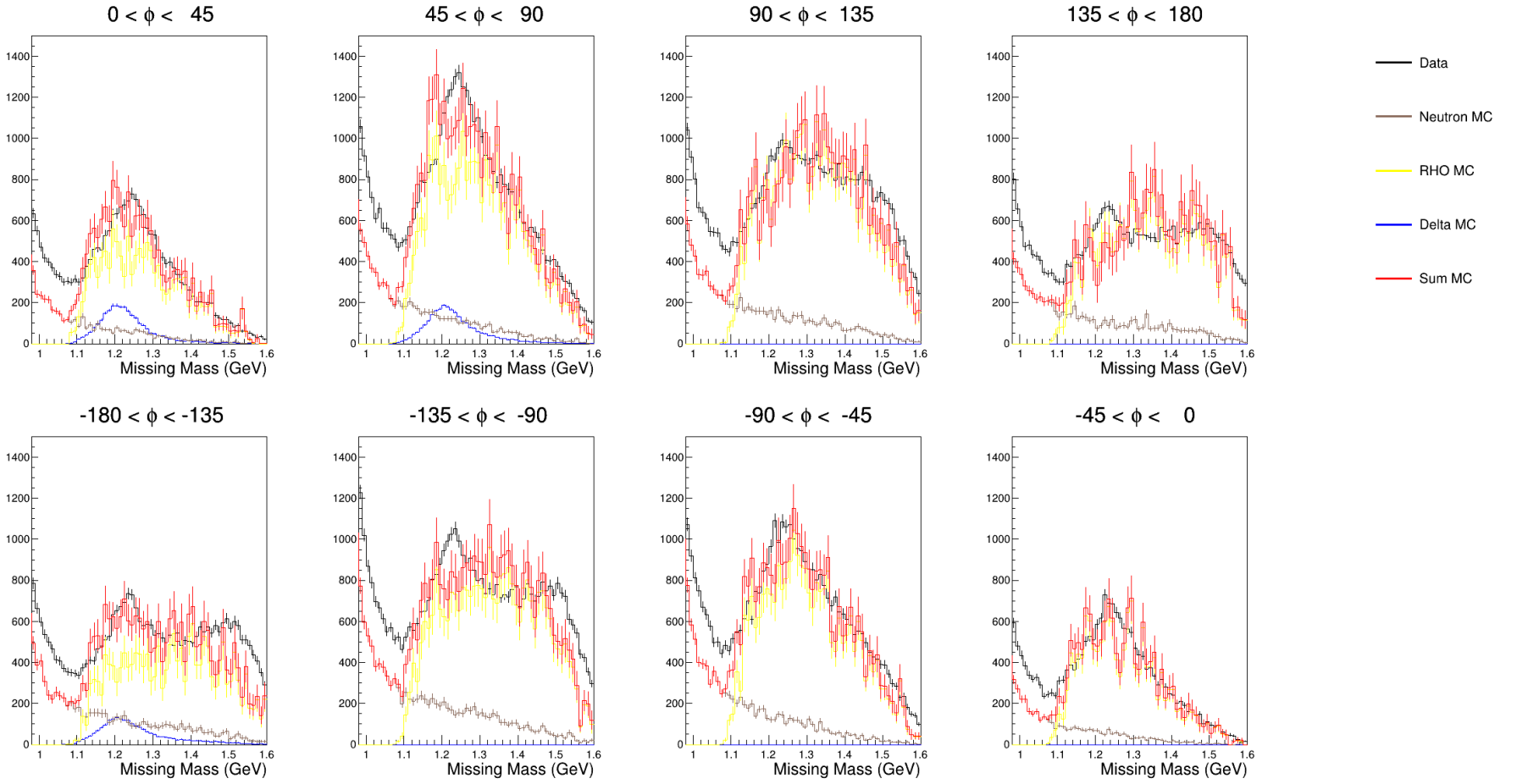




SIDIS v/s RHO


0 < ϕ < 45
45 < ϕ < 90
90 < ϕ < 135
135 < ϕ < 180
-180 < ϕ < -135
-135 < ϕ < -90
-90 < ϕ < -45
-45 < ϕ < 0
Missing Mass (GeV)
Data
Neutron MC
SIDIS MC
Delta MC
Sum MC

SIDIS v/s RHO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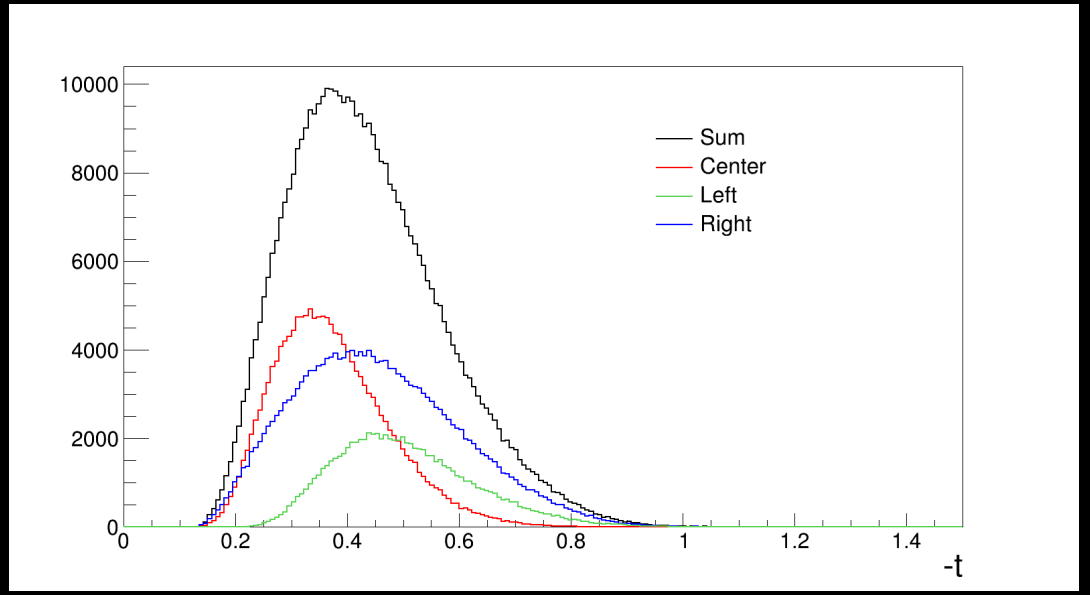
Sum MC

Q2 = 3.0, W = 3.14 (t-binning)

- At this setting, the statistics are enough to get two t-bins.
- Needed to decide where to put the bin boundary.
- Ideally, we could split the statistics in half but this is not possible due different *t* distribution.
- The optimized value is 0.425



Ideas for Systematic Error

- Challenging to accurately estimate systematic errors.
- Option 1
  - Calculate the Aysmmetry by using the Yield difference b/w data and MC.
- Option 2
  - Calculate the Asymmetry by fitting the Nuetron radiative tail instead of neutron peak.
- Other ideas??

Summary and Outlook

- Pi-Delta Missing Mass shape study is in-progress.
  - Only using SIDIS and Neutron as background processes (RHO gives a bad fit to data).
  - Rerunning SIMC (for more statistics) to reduce statistical fluctuations.
- Need ideas for systematic error estimations?
  - Can get two diffterent errors from the fit.
- Looked at the CLAS12 Pi-Delta BSA paper (Published June 2023).
  - Our kinematics ahve some iverlap with them (Can do a comparison).
  - No theory available for this channel.