

Beam-Related Events in the Far Detector



W. Anthony Mann

Tufts University

Marvin L. Marshak

University of Minnesota

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Analysis

- Use data from the R1_18 “spill” files from the beginning (March 2005) through 17 September 2005
- First event in Run 29365; last event in Run 32734 (Runs 31803 to 32106 missing because of tape archive problems)
- First LE beam event in Run 31722
- Reduce number of events by order of magnitude by checking that event also passes filters in the “all” files



Analysis

- Make monthly “long ntuple” (sntp) scan files for all selected events (~5 Mb)
- Tony scanned all events using NueAna; I scanned all events using Mad.
- ~90% agreement on first pass; discussed discrepancies



Analysis

- Classify “lepton”
 - 1= μ
 - 2=e
 - 3=neutral current
 - 4= μ /NC ambiguous
 - 5=e/NC ambiguous
 - 6=Junk



Analysis

- Classify reaction
 - 1=quasi-elastic
 - 2=resonant
 - 3=deep inelastic
 - 4=ambiguous



Analysis

- Identify charged current events as “lepton contained in the detector” or “lepton not contained in the detector”
- Identify “rock events” as “lepton ends in the detector” or “lepton exists detector”



Fiducial Cuts

- An event is removed for reasons of fiducial volume if the candidate vertex is so close to the North/South face or any longitudinal face of either of Super Module 1 or 2, so that there is no discernible gap between the candidate vertex hit cluster and the detector outer surface.
- For candidate vertices which are near North or longitudinal side faces and which have short track(s) which exit the detector, the event is removed if the visible track length is insufficient to ensure good pion discrimination and a momentum determination from curvature.



Results (Before LE beam)

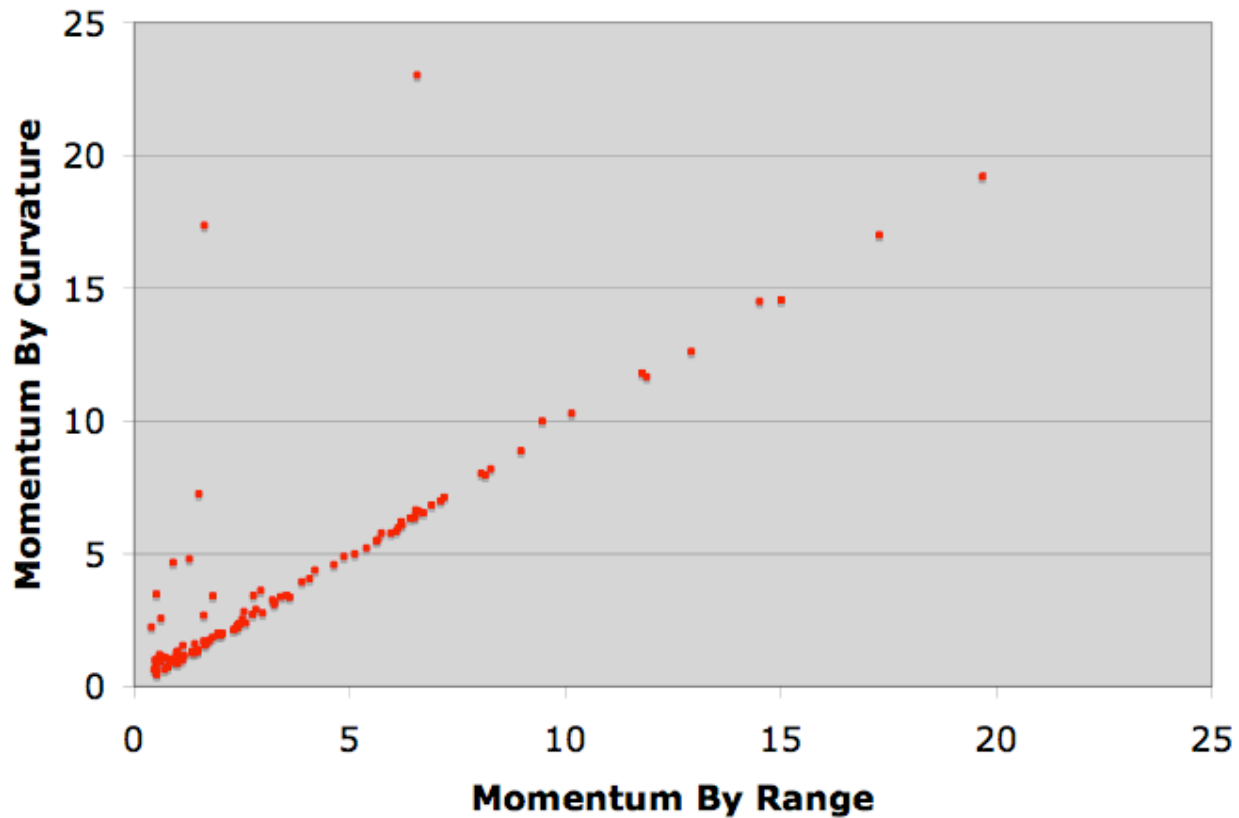
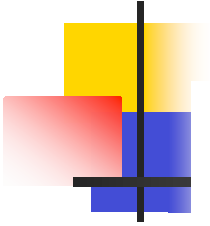
- Lepton is μ : 19
(3 quasi-elastic, 5 resonant, 11 deep inelastic)
- Lepton is e: 0
- Neutral Current: 1 (resonant)
- e/NC ambiguous: 1 (resonant)
- Rock events: 8 (all contained)



Results (LE beam)

- Lepton is μ : 62
(15 quasi-elastic, 10 resonant, 37 deep inelastic)
- Lepton is e: 5
(2 quasi-elastic, 3 resonant)
- Neutral Current: 17
(4 quasi-elastic, 5 resonant, 8 deep inelastic)
- μ /NC ambiguous: 18
(3 quasi-elastic, 5 resonant, 10 deep inelastic)
- e/NC ambiguous: 11
(3 quasi-elastic, 2 resonant, 6 deep inelastic)
- Rock events: 43 (33 contained, 10 not contained)

Lepton Momentum (cc and rock)





Next Steps

- Keep up with new data
- Scan MC events
- Open to other ideas