



THE UNIVERSITY OF
CHICAGO

Muon Disappearance Analysis Update

Joseph Zennamo, U.Chicago
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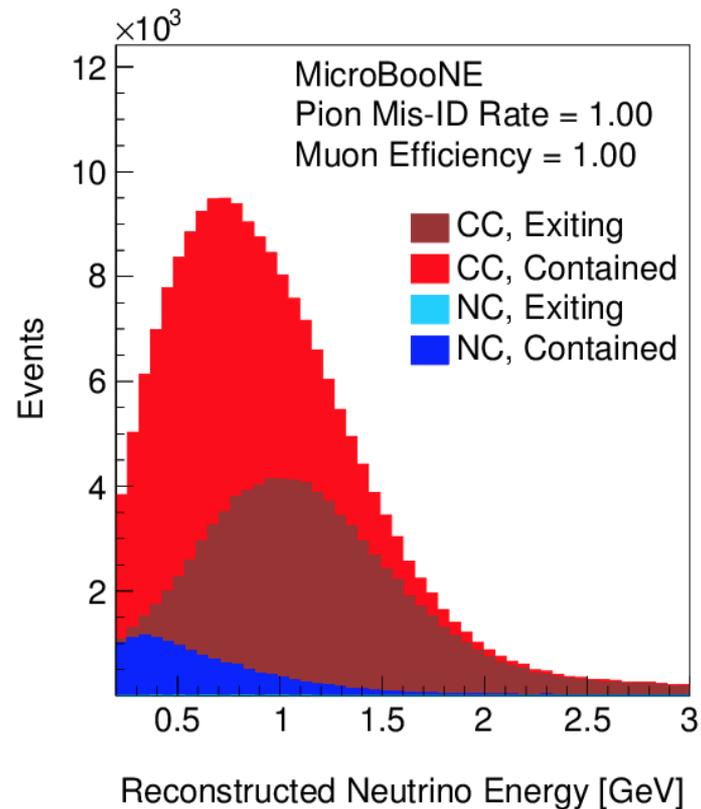
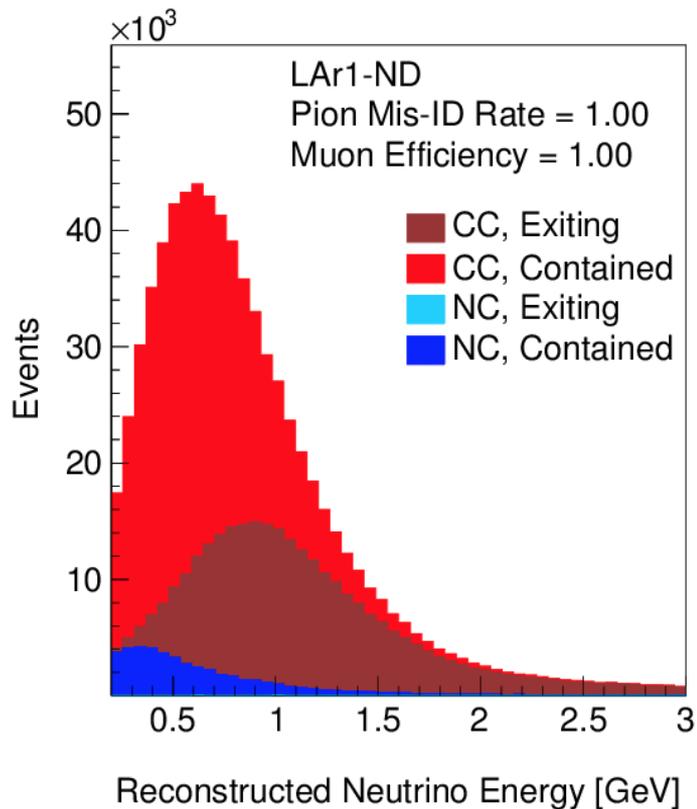
Neutral Current Background

- Charged pions will be difficult to distinguish from muons in our detector
- We have investigated the effect of this background on our sensitivities
 - We use the assumption that the NC events have no oscillation signature
- Charged pion/muon separation efficiency has not been determined in LAr
 - To address this we select some possible values and see the effect on the sensitivity

Event Types

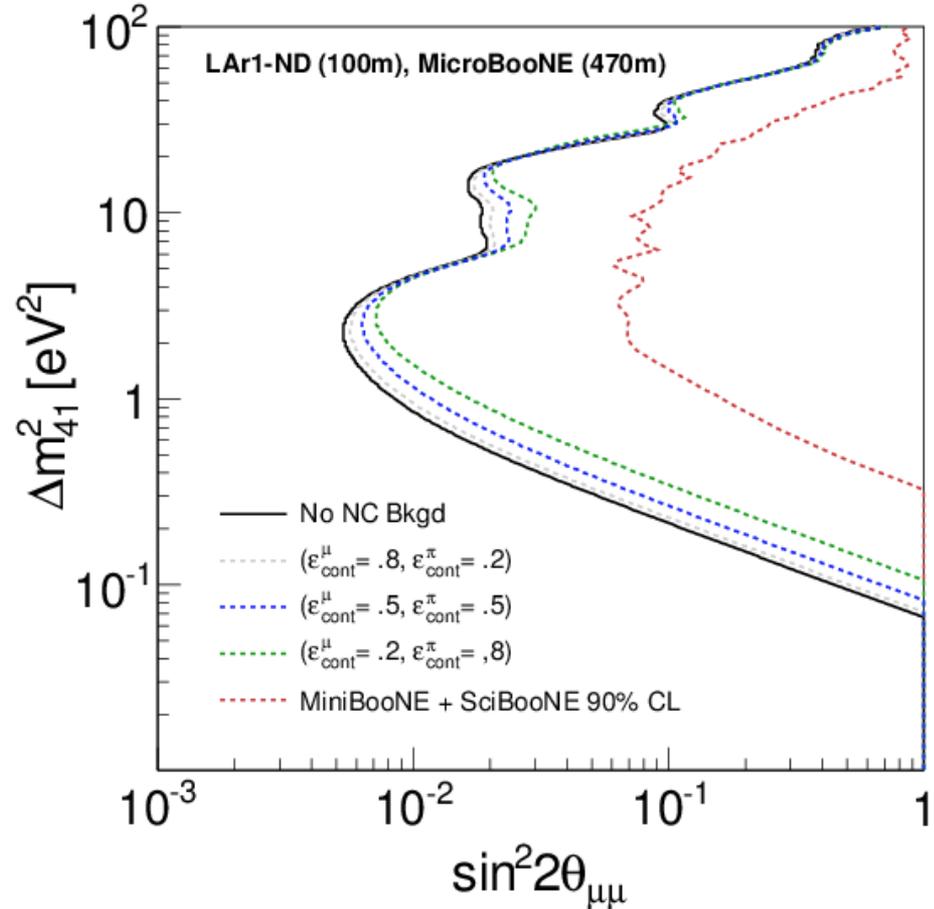
- Charged pions and muons which exit the detector cannot be distinguished due to their similar dE/dx signature
- For events which have contained charged pions and muons we will be able to separate them from how the track terminates
 - We will assign a muon identification (and a charged pion mis-identification) efficiency

Distribution of Events



Sensitivity

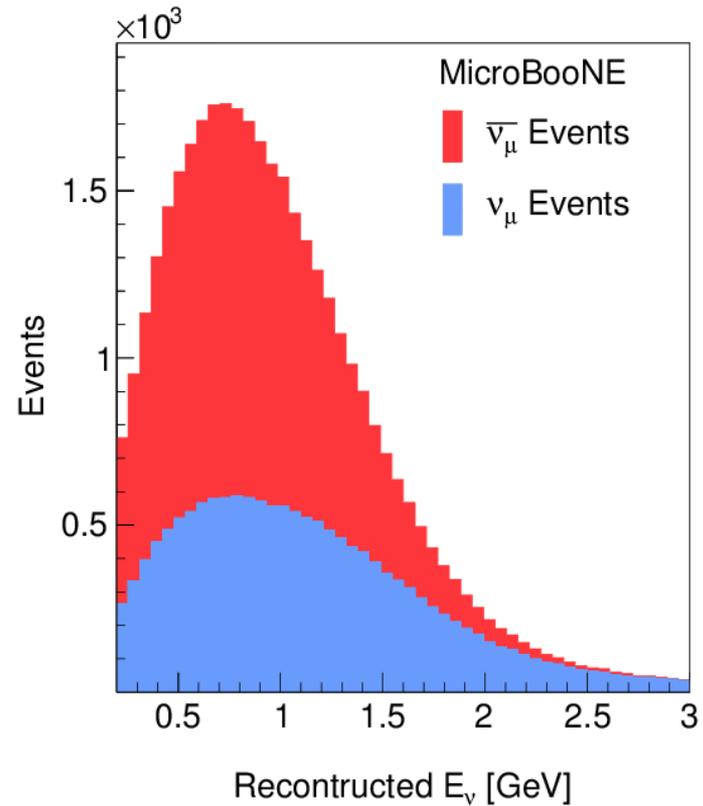
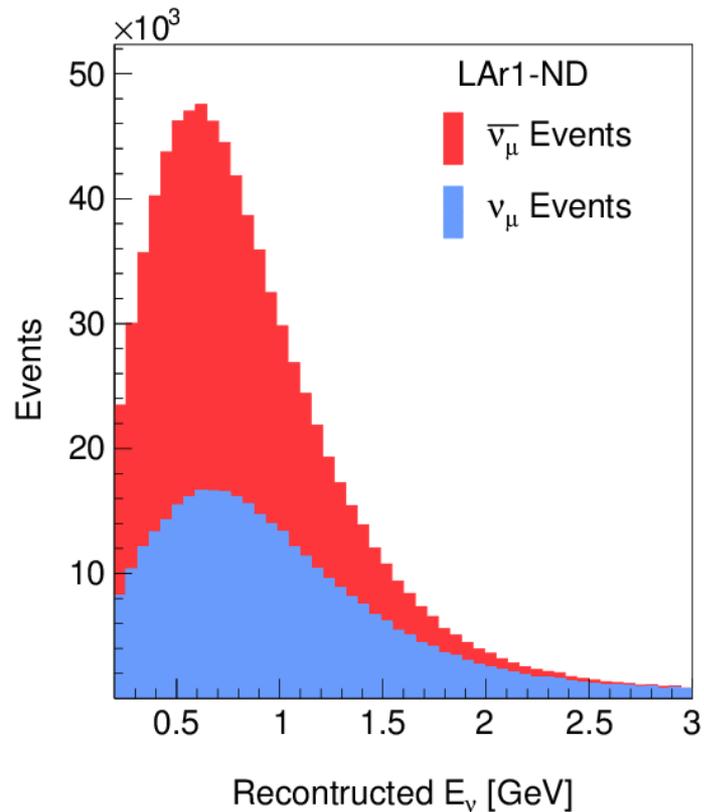
- Three sets of efficiencies for separating contained charged pions and muons are used
 - Realistic, a coin toss, and unrealistic
- The effect is not dramatic on this log-log plot
 - We are currently working on a new way to display these differences which will convey the scale



Antineutrino Running

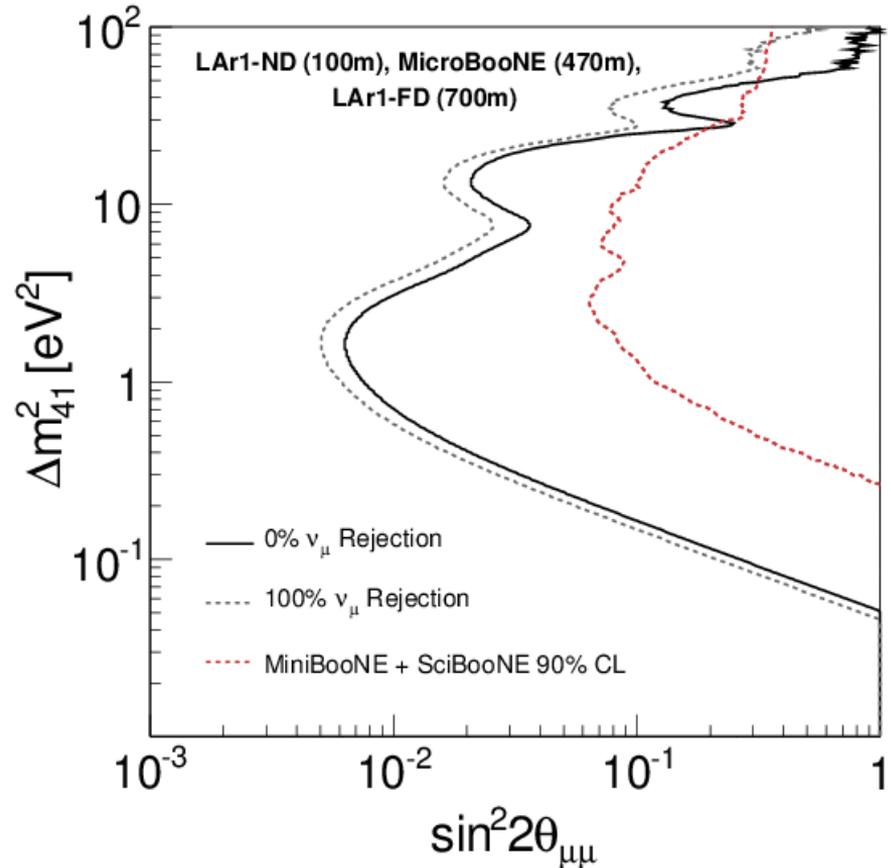
- Charge selection (in antineutrino mode) is one of the main motivating factors for a magnetized detector
- To investigate this we look at the neutrino background in the antineutrino beam
 - We then measure the sensitivities with and without this background
 - We assume for these sensitivities that the neutrinos will not oscillate, only antineutrinos will do so

Event Distributions



Sensitivity

- When measuring the sensitivity we use the “bathtub” detector to measure the “0%” curve and a magnetized detector for the “100%” curve
 - We are currently working on a new way to display these differences which will convey the scale



Conclusions

- We have investigated the effect on the sensitivities from the neutral current and the neutrino backgrounds
 - The results showed no dramatic effects by suppressing these backgrounds
- If anyone can think of more studies that would help us prepare for the PAC meeting please let us know!