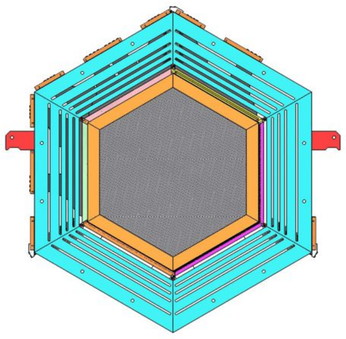


Measurement of Muon Neutrino CCQE-Like Scattering in MINERvA at E_ν~ 6 GeV

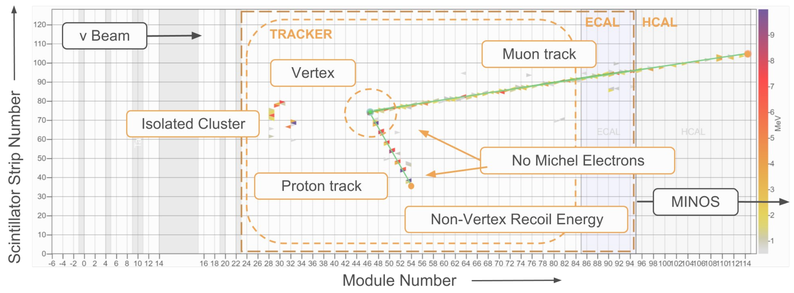
Mateus F. Carneiro
In behalf of the MINERvA Collaboration

CCQE-Like and the MINERvA Detector

MINERvA is a dedicated on-axis neutrino-nucleus scattering experiment running at FNAL in the NuMI beam

Having a main core fine-grained scintillator tracker surrounded by calorimeters permits us to select CCQE events with:

1 Muon track (matched in the MINOS Near Detector)
Any number of nucleon tracks
No pions:
No Michel electrons | Proton dE/dx | Max of 1 isolated cluster

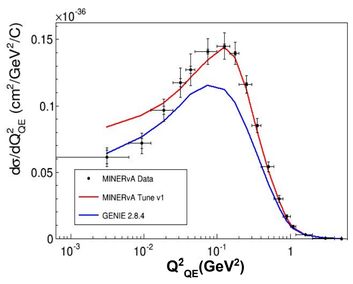


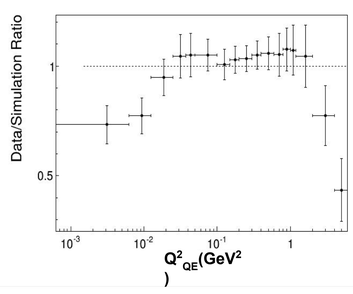
Low Energy Q^2_{QE} Cross Section

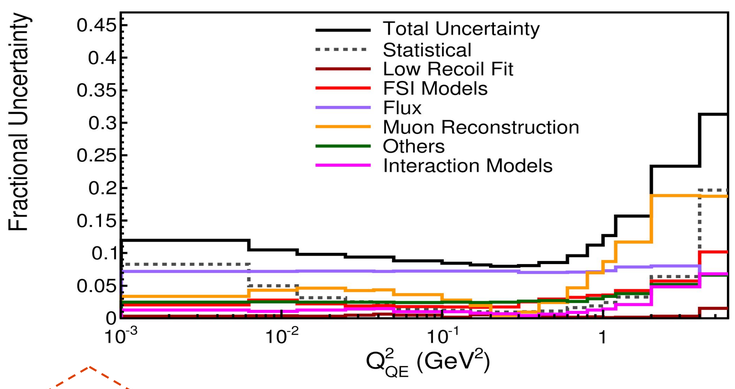
Low energy analysis done over a 3.30×10^{20} POT dataset

Q^2 calculated using the CCQE hypothesis and muon kinematics

Results here compared with nominal GENIE (blue line) and our modified GENIE version (red line)





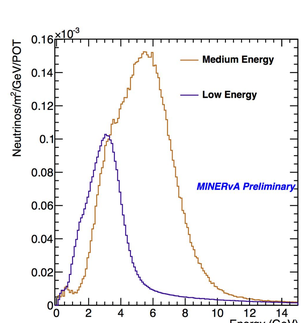


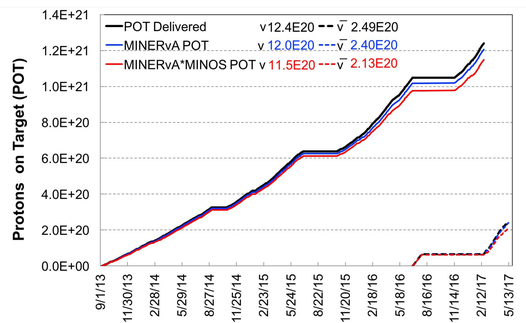
The road to Medium Energy

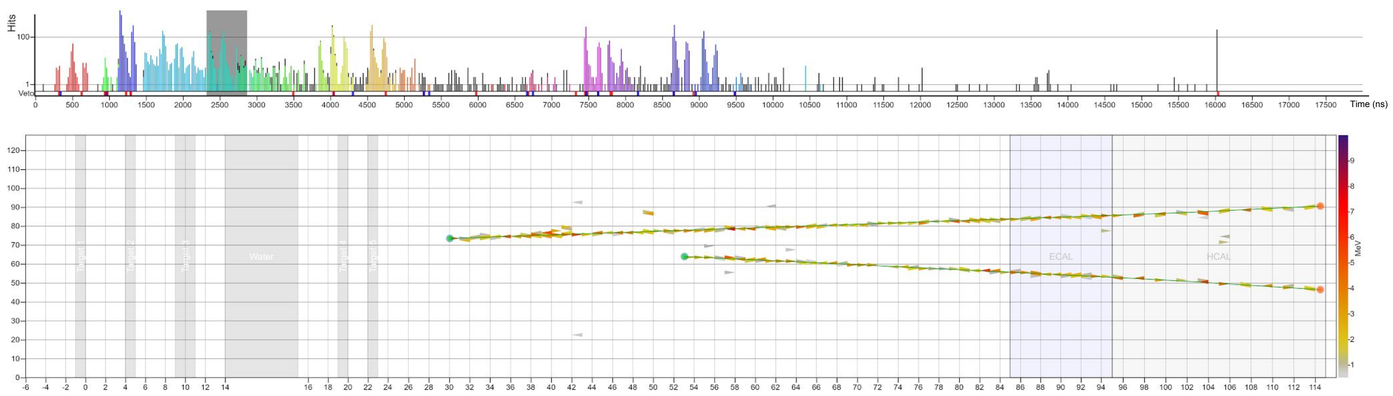
The new energy regime of the NuMI Beam provides not just a higher energy range but an impressive new intensity

With the increase in the proton beam intensity the reconstruction needs to be improved

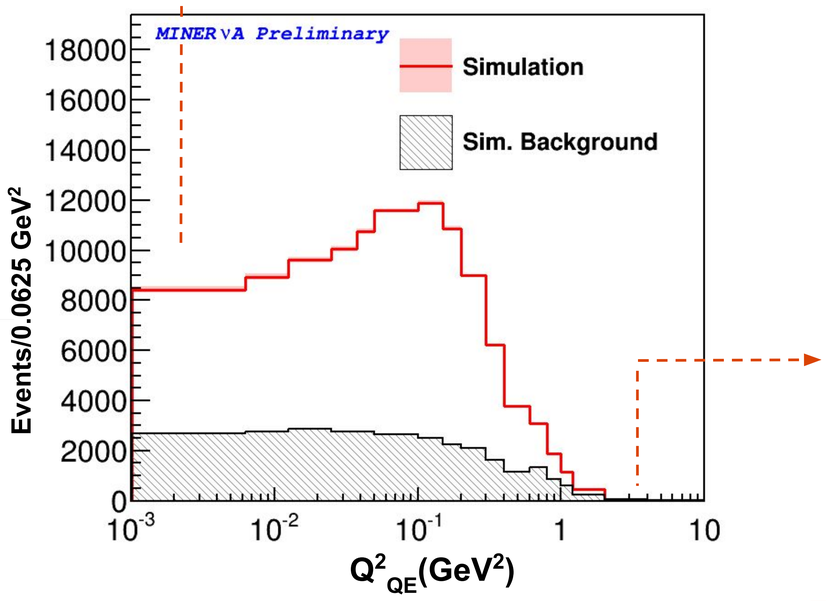
For example overlapping neutrino events require a change in the way we divide up energy deposition as a function of the time into the beam spill

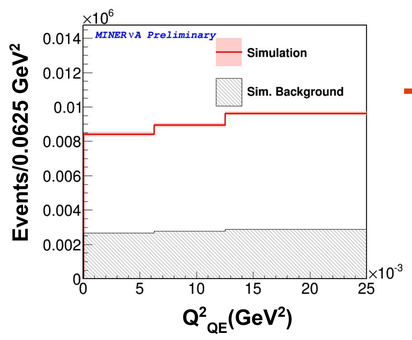




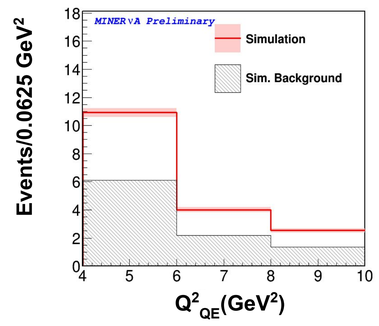


Medium Energy Analysis Statistics





~ 1500 signal events in between 0 and 6.25×10^{-3} GeV^2



~ 6000 signal events in between 0 and 4 and 6 GeV^2

E_ν~ 6 GeV data set analysis currently in progress

Plots show Q^2_{QE} MC stat scaled to the full data set

12×10^{20} POT neutrino data collected in Medium Energy mode which provides an yet unreached resolution with a greater range of Q^2_{QE}

Statistics improved also for the lower Q^2_{QE} bins

Conclusion/Summary

MINERvA's newest CCQE results are ready to come out testing new models (see Daniel Ruterbories poster)

Medium Energy dataset to achieve incredible high statistics and new ranges for studies

Oregon State University

Acknowledgments
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