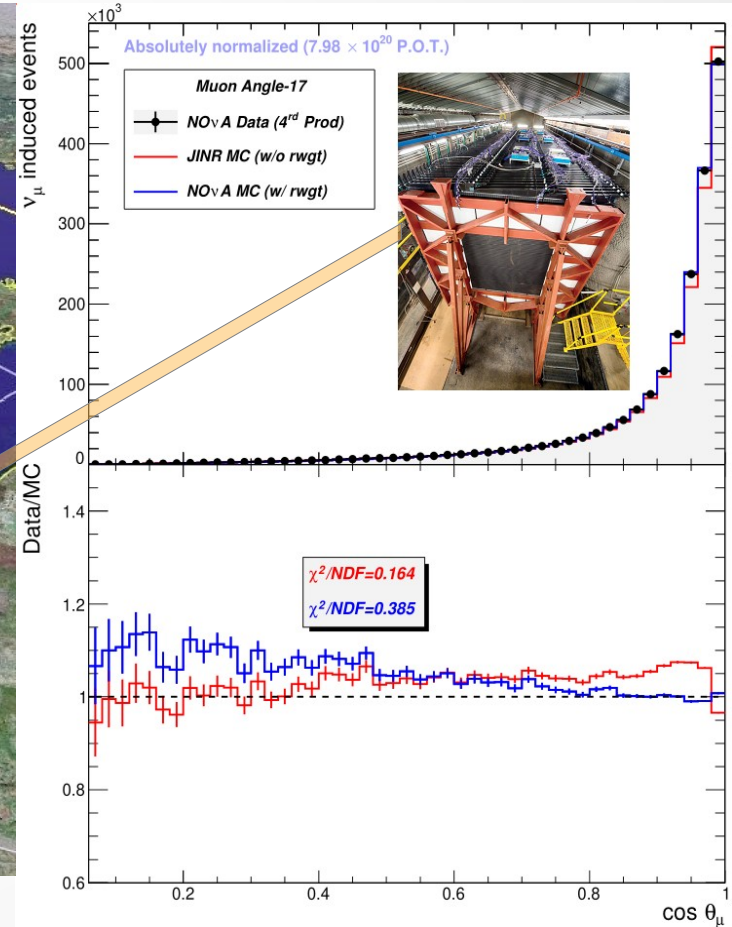
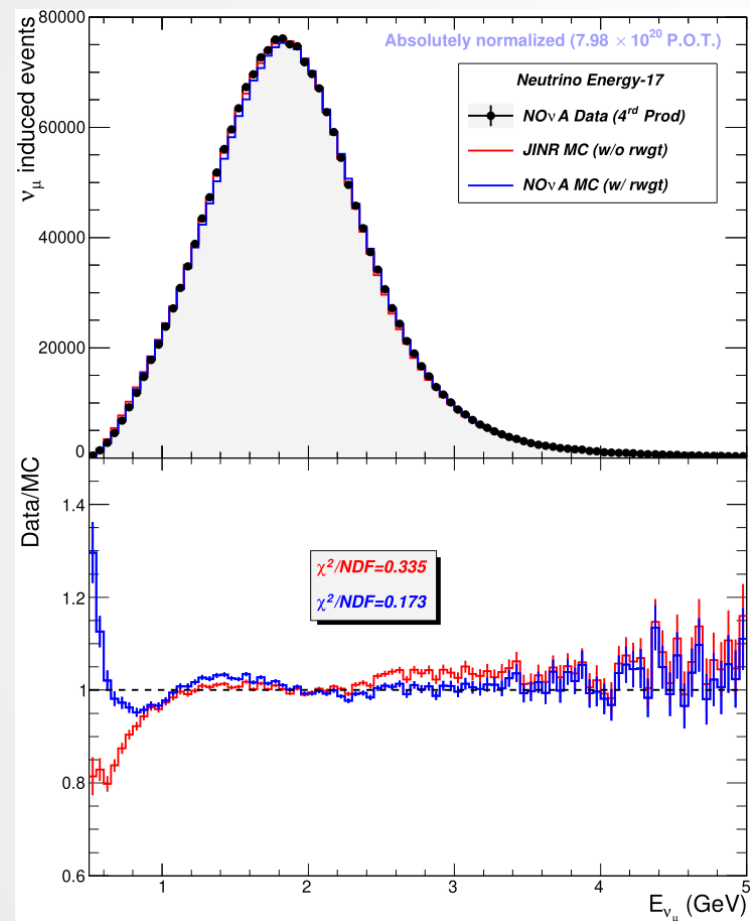


Modeling Neutrino Interactions at NOvA ND

Sector 3 account in JINR PAC (January 17, 2019)



Annotation

BLTP group (Sector 3) participates in the long baseline neutrino oscillation experiment NOvA (FNAL, Batavia), providing a theoretical and phenomenological support to the modeling the neutrino and antineutrino interactions with the nuclear target of the NOvA Near Detector (ND).

Slide shows a comparison of the JINR interaction model (“JINR MC”, red histograms) with the current ND data (black points) and with an alternative analysis of a Fermilab group (“NOvA MC”, blue histograms).

Left panel: Muon neutrino induced count rate vs. reconstructed muon energy.

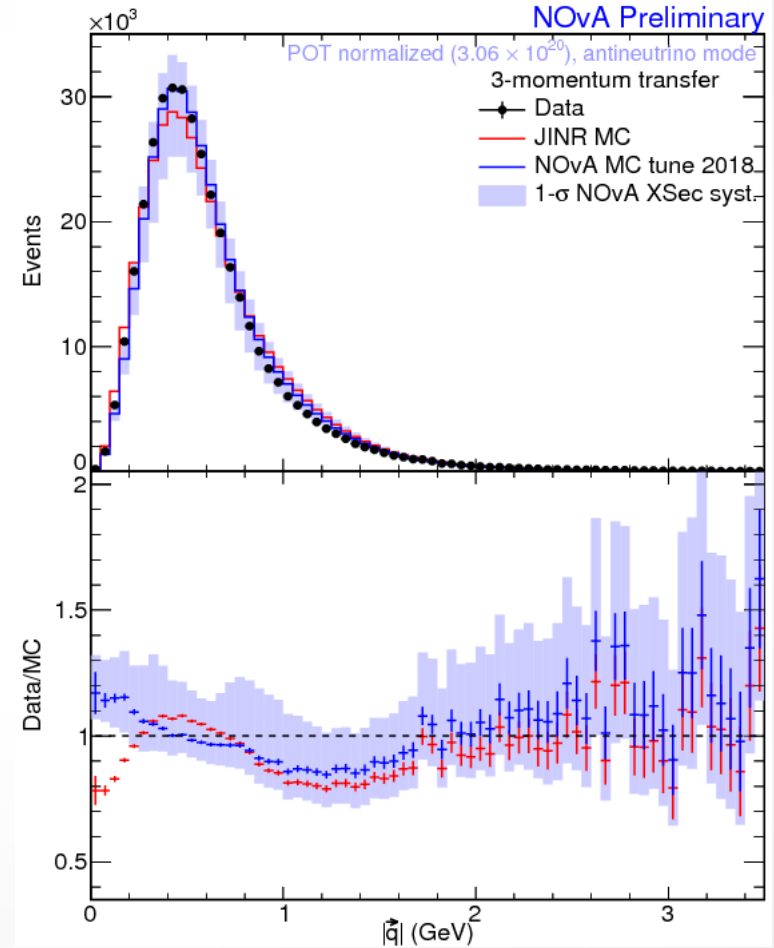
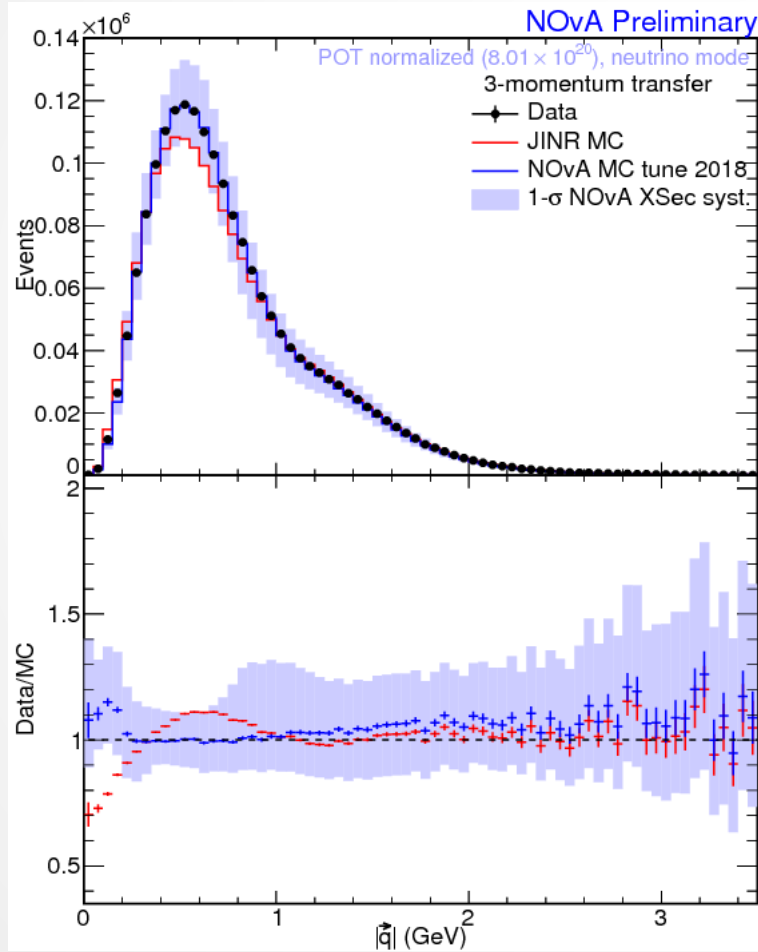
Right panel: Muon neutrino induced count rate vs. reconstructed cosine of the muon scattering angle.

Middle panel: Map of the NOvA LBL neutrino experiment.

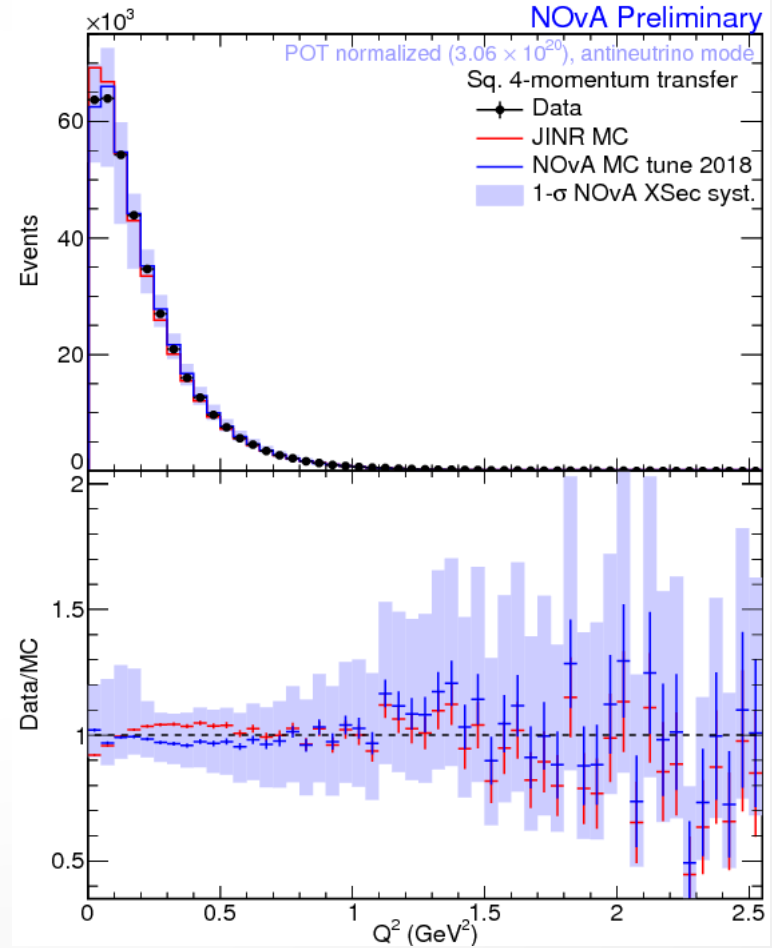
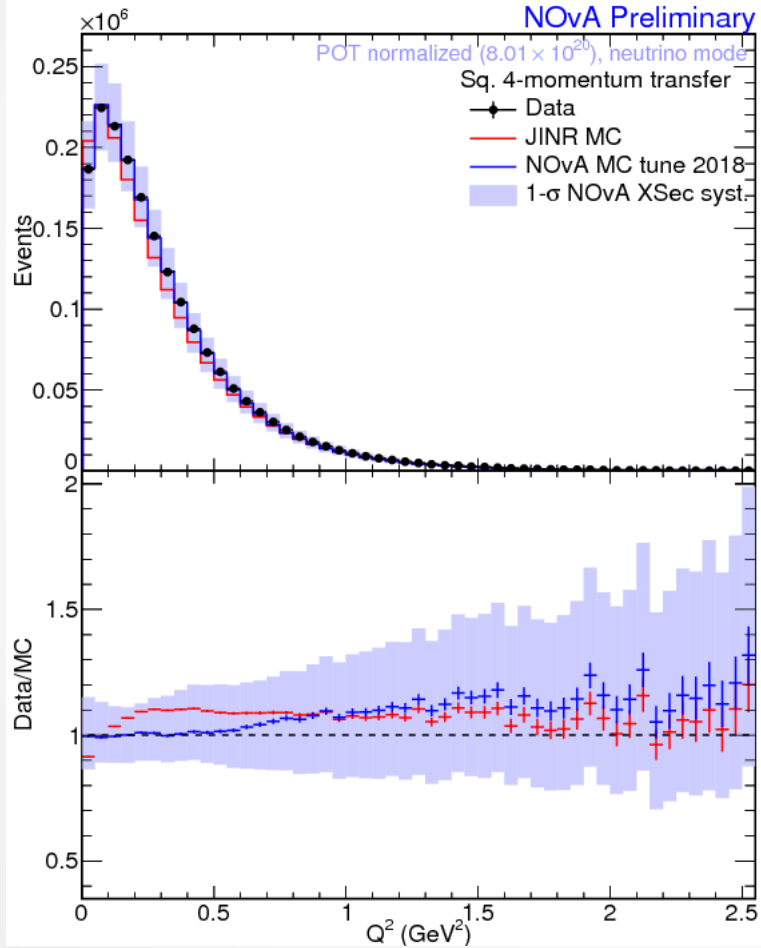
Note that the NOvA MC is tuned to the NOvA ND data while the JINR MC does not use any tuning.

Both models utilize the Monte Carlo neutrino event generator GENIE and our group actively participates in the development of this generator, within the framework of the international GENIE collaboration.

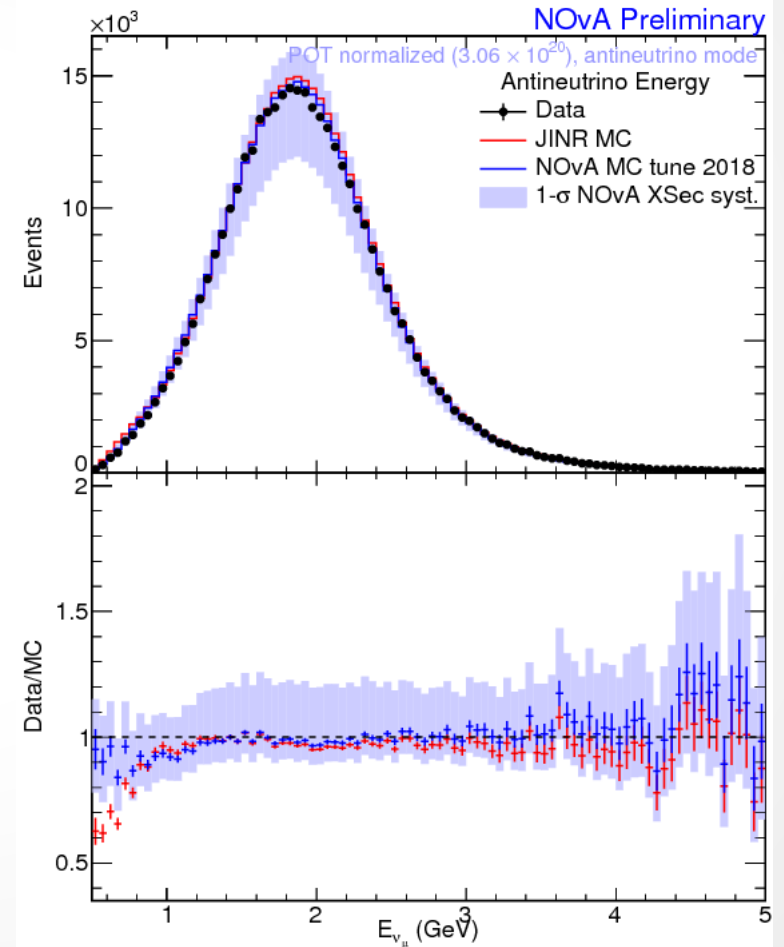
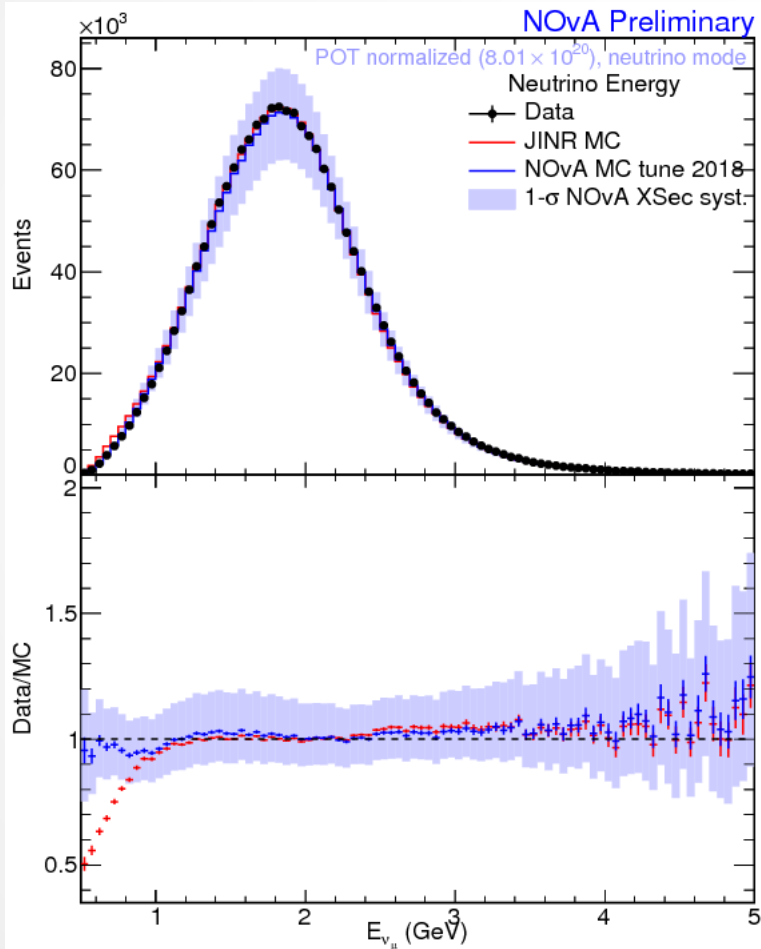
Data/MC for distributions in 3-momentum transfer for FHC (left) and RHC (right)



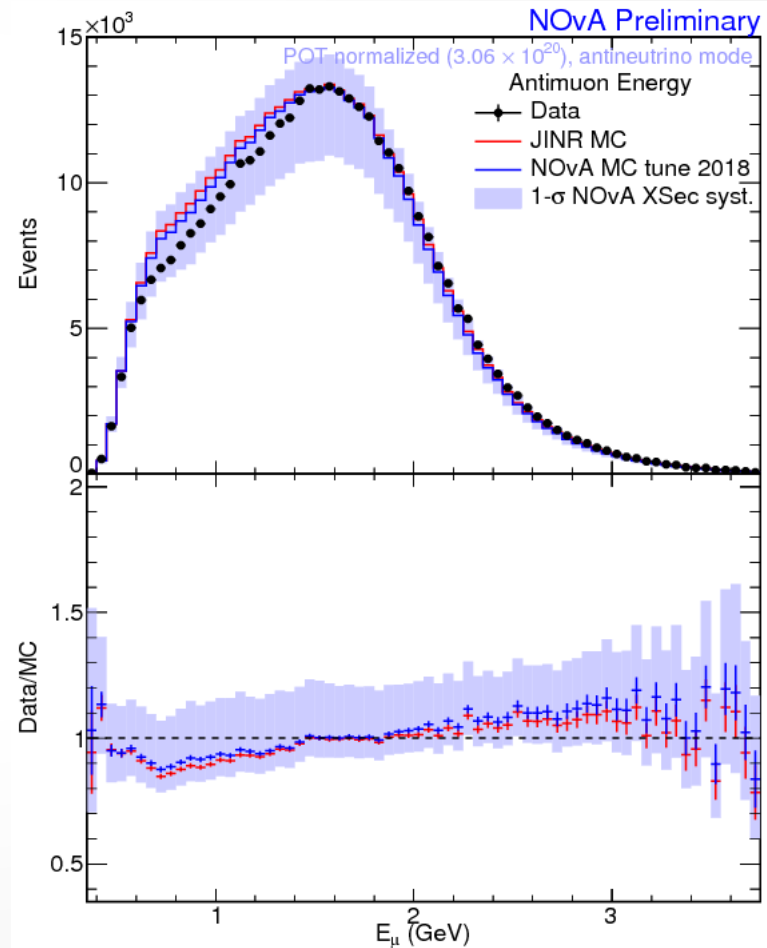
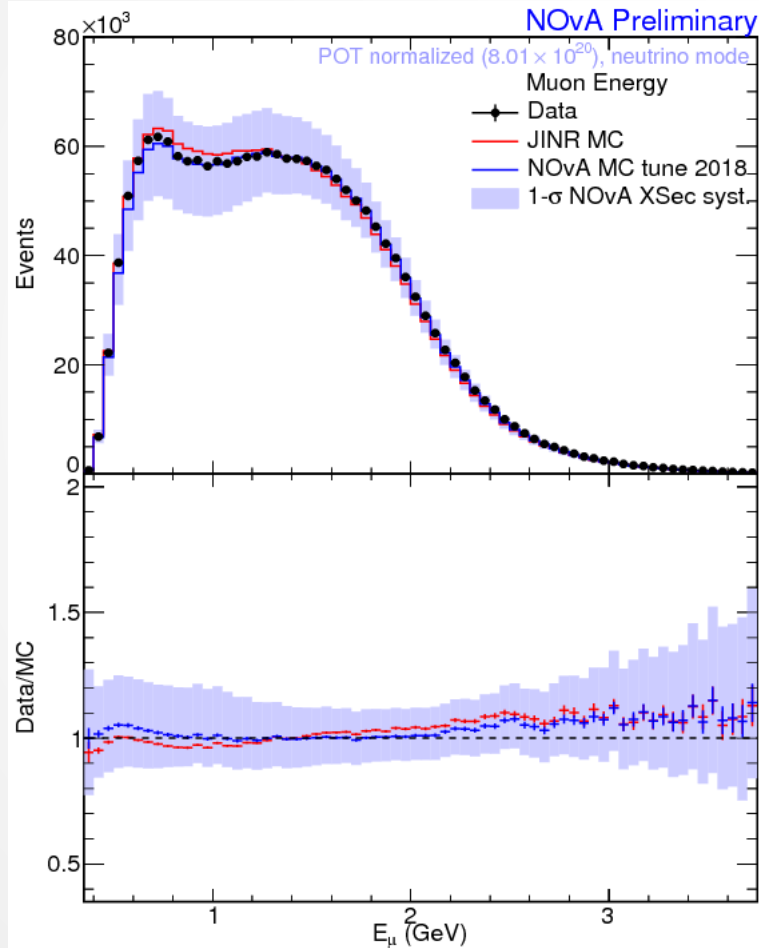
Data/MC for distributions in squared 4-momentum transfer for FHC (left) and RHC (right)



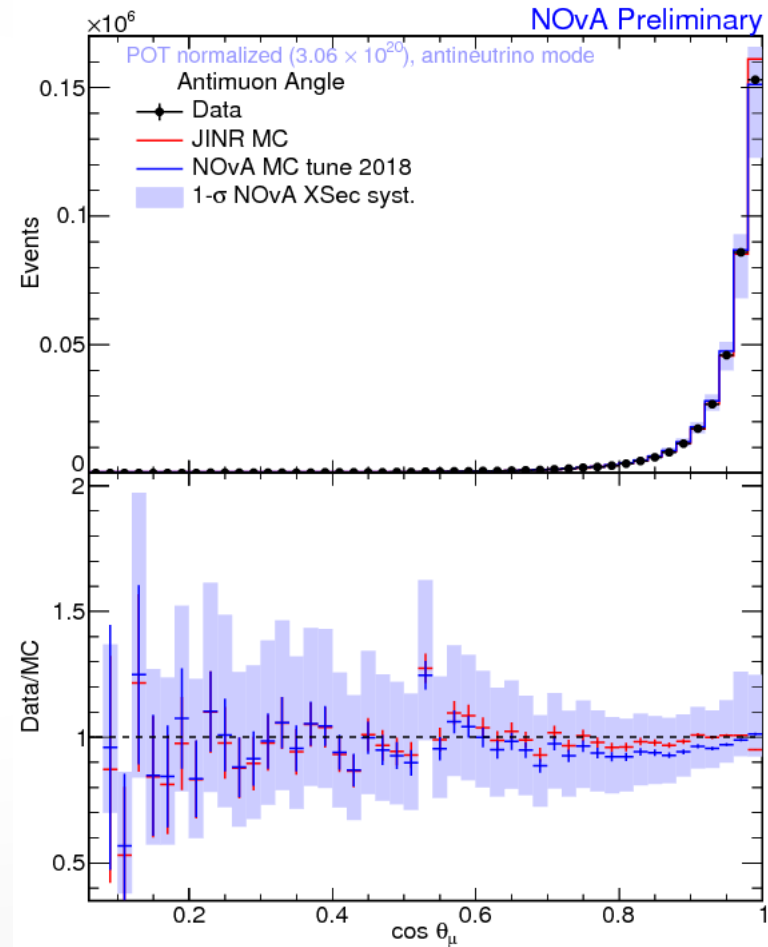
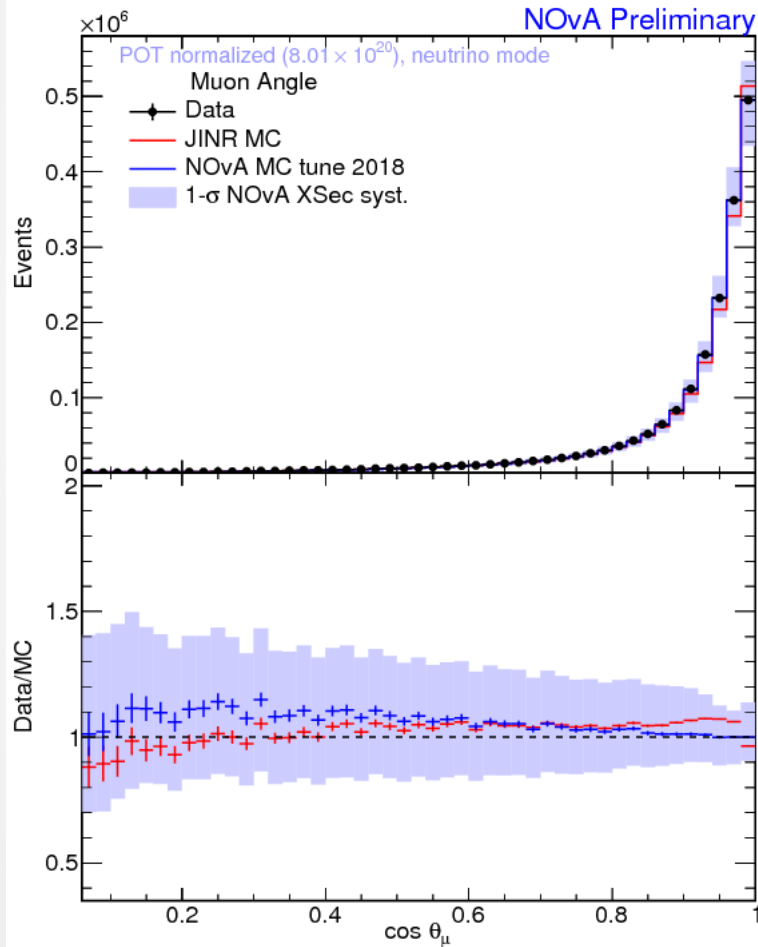
Data/MC for distributions in (anti)neutrino energy for FHC (left) and RHC (right)



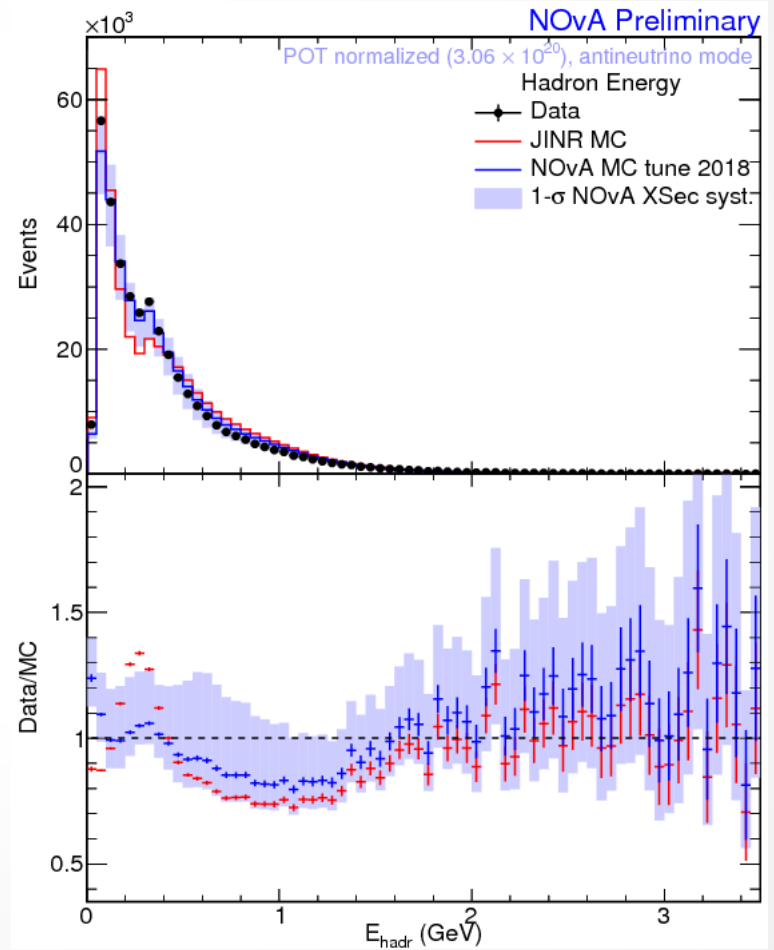
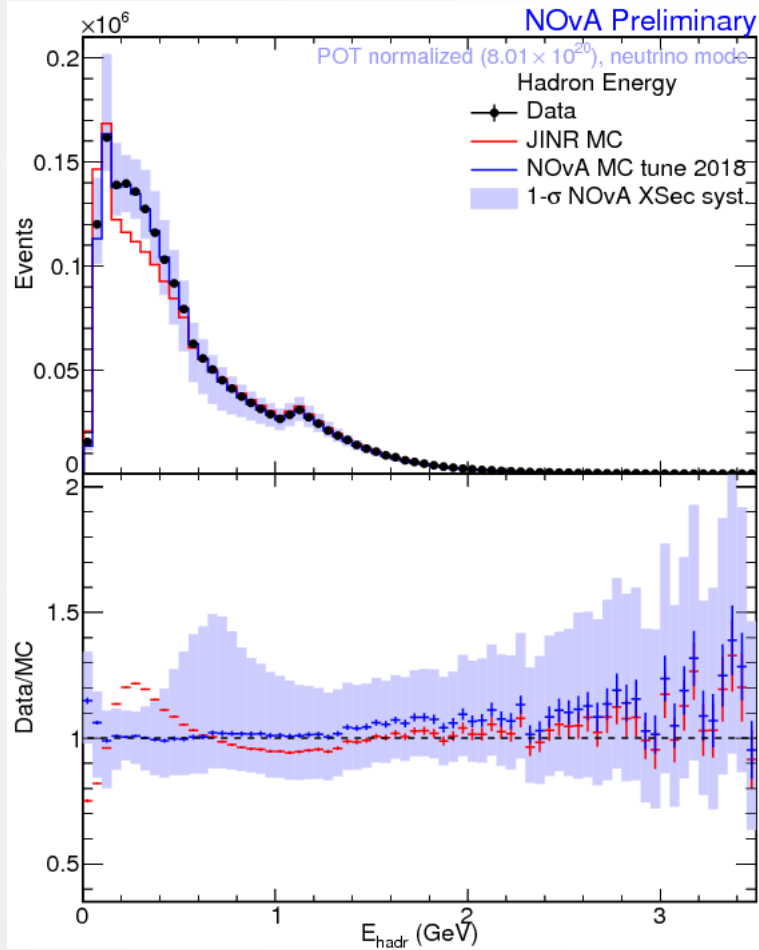
Data/MC for distributions in muon energy for FHC (left) and RHC (right)



Data/MC for distributions in cosine of muon scattering angle for FHC (left) and RHC (right)



Data/MC for distributions in hadron shower energy for FHC (left) and RHC (right)



Data/MC for distributions in hadron invariant mass for FHC (left) and RHC (right)

