

Upstream Veto Wall Efficiency

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Outline

- Introduction
- Detection efficiency
- GEANT results
- Plots
- Conclusions
- Outlook



Introduction

- Neutrons in the upstream veto wall self-veto events
- We expect a 20% neutron efficiency
- Use a number of events ratio to find the veto wall neutron efficiency



GEANT Simulation

- Many different configurations:
 - turn off GEANT particle propagation if the particle is in the veto wall (particles only enter the veto wall)
 - Fixed cut of 0.08GeV on particle momentum
 - use different neutron efficiencies
 - full GEANT simulation
 - vary the hadron and neutron threshold
 - 0.02GeV and 0.2GeV
 - vary the veto counter material
 - plastic, scintillator

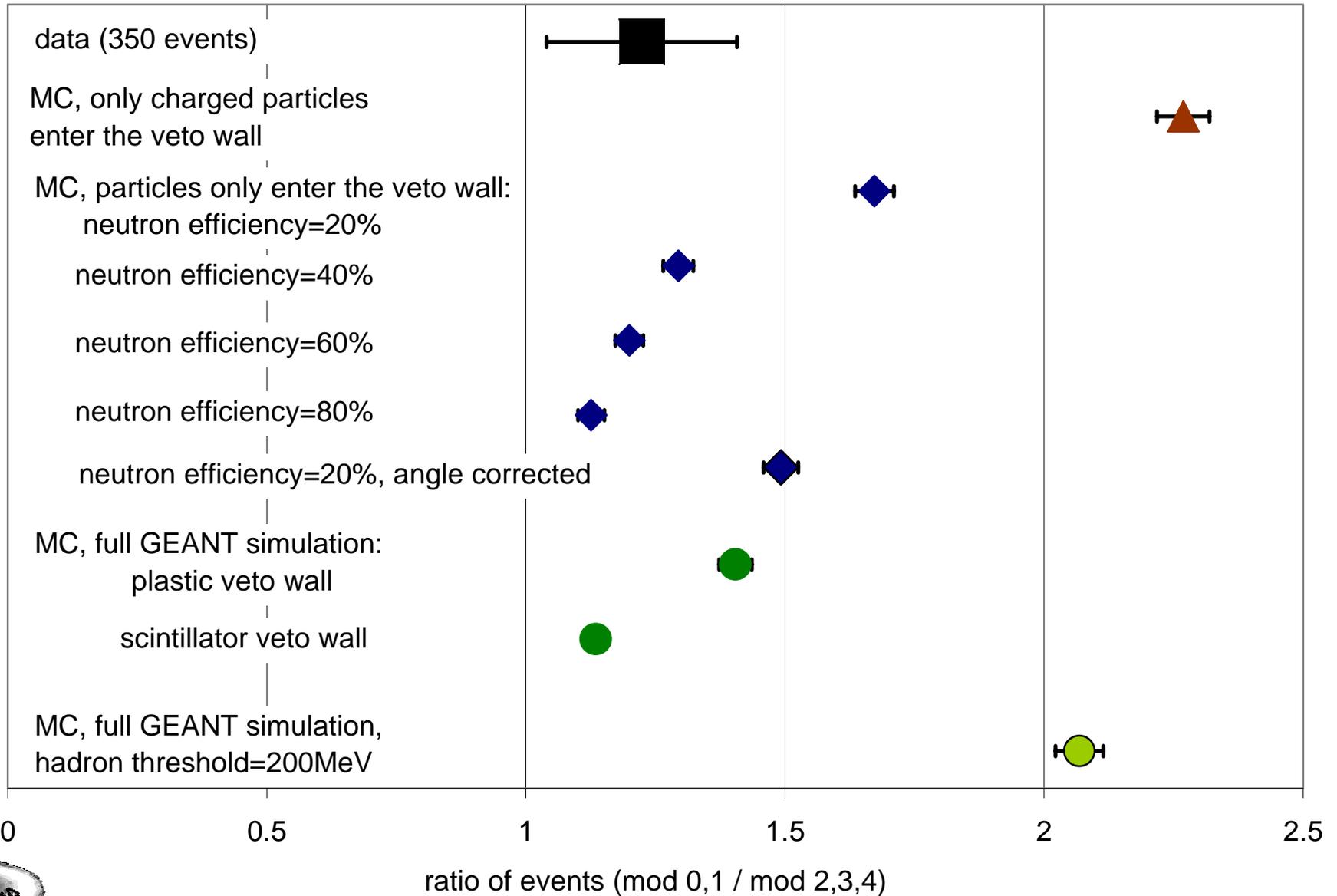


Plot

- Ratio of the # of events in upstream modules over the # of events in downstream modules
 - (mod 0,1) / (mod 2,3,4)
- software-selected muon events from nustrip files
 - all four run periods
 - 350 events total
- MC: include nustrip efficiency, selection efficiency



Ratio of # of events for different GEANT runs



Conclusions

- The full GEANT simulation agrees with data
- The corresponding veto wall efficiency is 40% to 60%
- The remaining uncertainty is dominated by the statistical uncertainty in the data
 - What exactly is the neutron efficiency?
 - Should we use plastic or scintillator for the veto wall material?



Outlook

- Implement the veto wall in the MC
- Continue to work on the predicted neutrino flux
 - find ν_e CC events in the nustrip files
 - number of muon events
 - number of category 3 events

