Status after bug fix summary

10 May 2012

Reisetter

Muon generation

- We have Chao's MUSUN code (fortran from Vitaly), packaged for use by Anthony, useable for generation of muons at Homestake level and Soudan level
- At both levels, muons generated on parallelpiped surrounding rock
- For Homestake level, using the code musun-dusel-notflat.f. Does Chao have another version to generate muons on a flat plane as in his write up?
- This parallel piped is efficient, but will make livetime calculations more difficult.

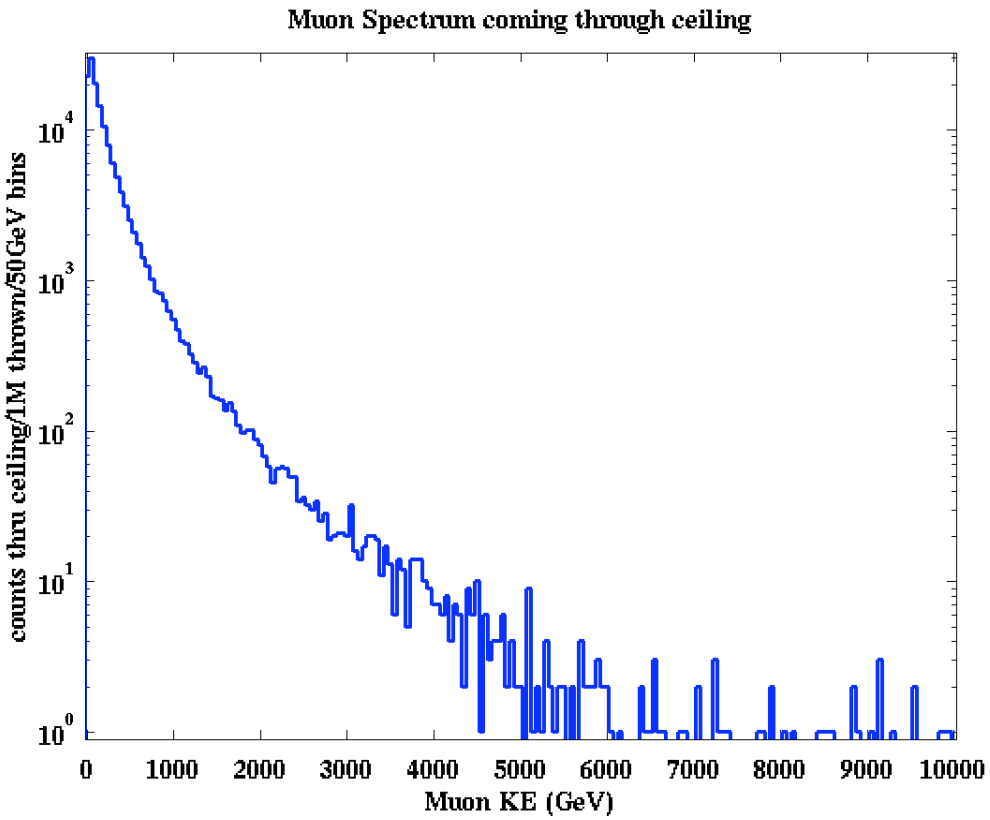
Muon generation progress

- Using parallelpiped generation
- Generated 100mill muons for LBCF. Needs to be checked for consistency, etc.
- Generated 60 mill muons for Homestake (roughly 5 years of livetime for a 34x34x34m block intended for use around a 20x20x20m cavern)
- Muon files at: http://cdmsnano.fnal.gov/xfer/simData/

With patch, ran Chao's 1M muons through rock and GEODM geometry

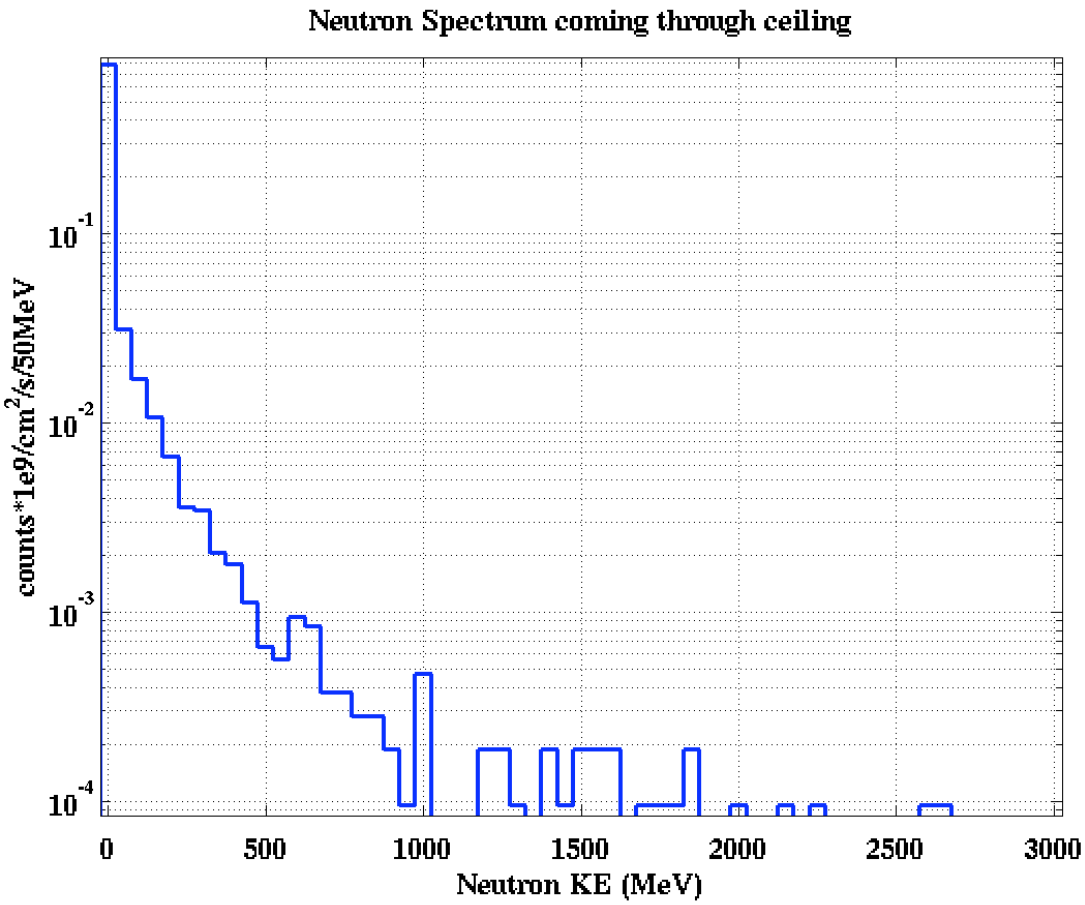
- Livetime note: not clear whether these 1M muons come from a parallelpiped (as in the code Chao sent me) or in a flat 50mx50m plane (as indicated in his previous writeup)
- If parallelpiped, this is 1 month (31 days) of livetime
- If flat sheet, this is 72 days livetime
- I used flat sheet for normalization for neutrons

- Muon summary: 207k in cavern (126.7k coming through top surface), average energy 251GeV

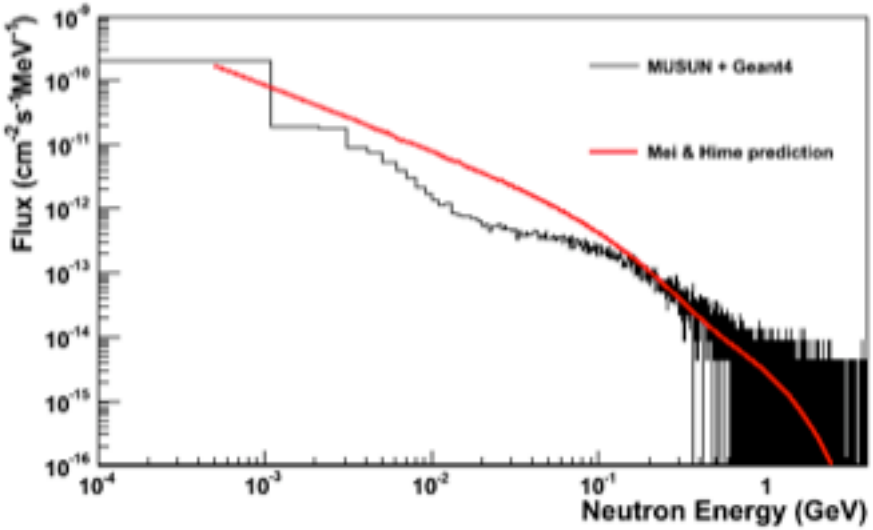


With patch, ran Chao's 1M muons through rock and GEODM geometry

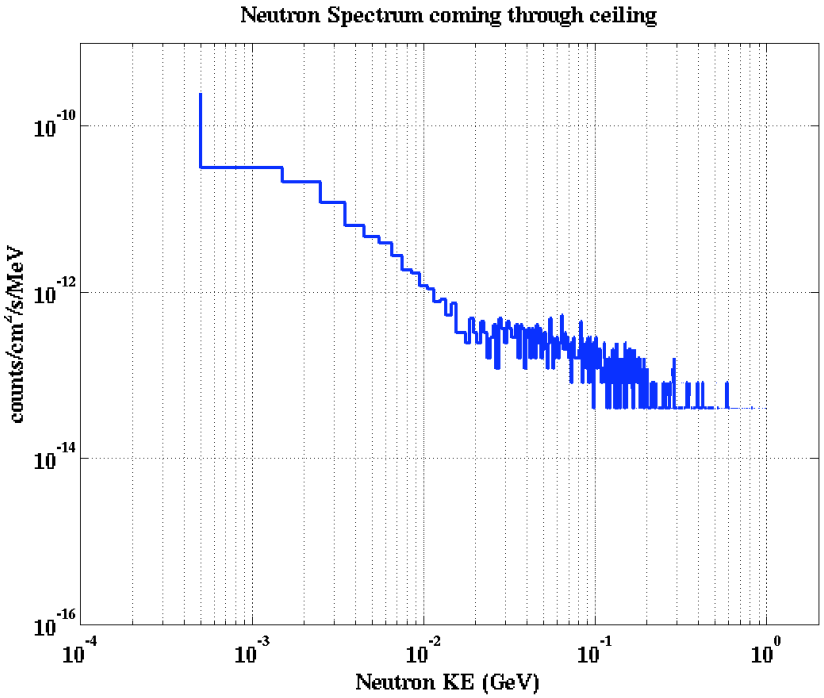
- Neutron summary:
  - 7836 events in cavern with neutrons (4320 also have muons in cavern)
  - 15.4k neutrons in cavern (boundary, not detector)
  - average energy 9.9MeV



Comparison to Chao's analysis



From Chao's "Solo neutron" distribution



Comparison to Chao's analysis