Geant4/FLUKA Working Group Progress

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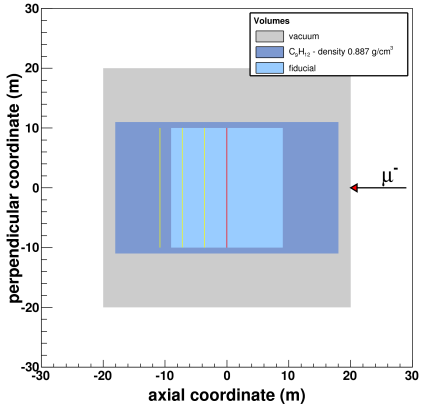
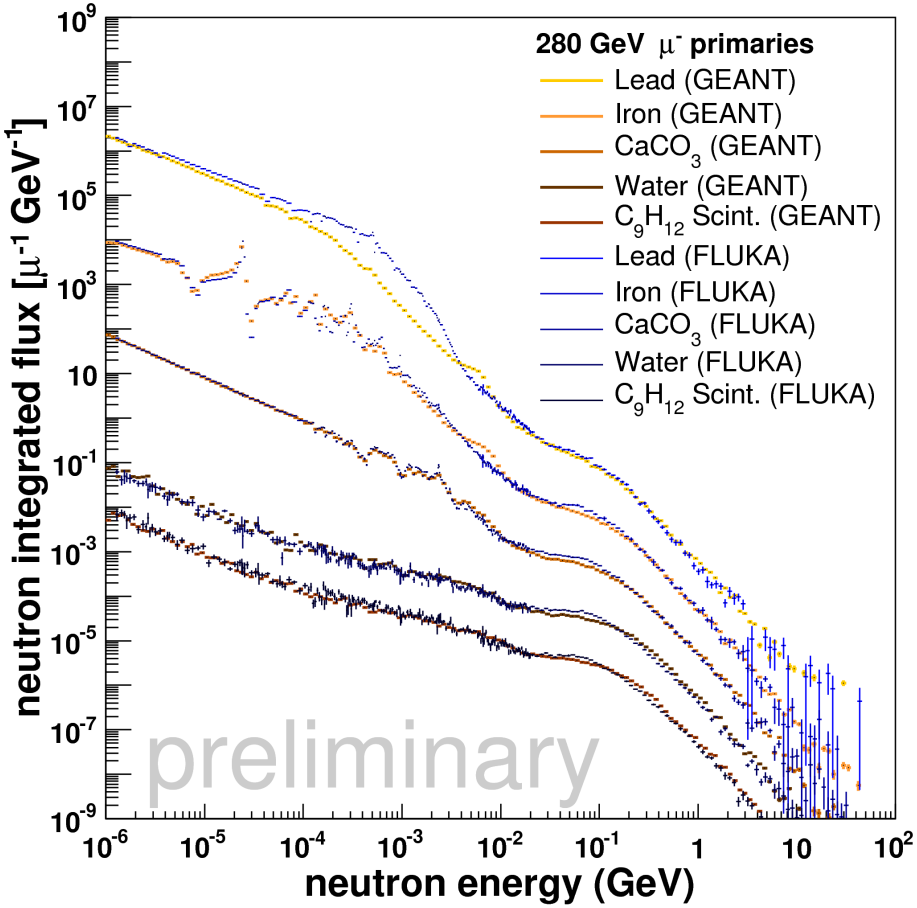
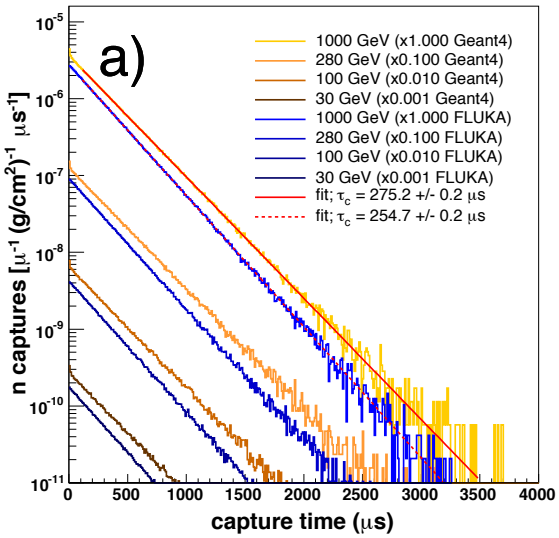
Flux Comparisons for Many Energies and Materials

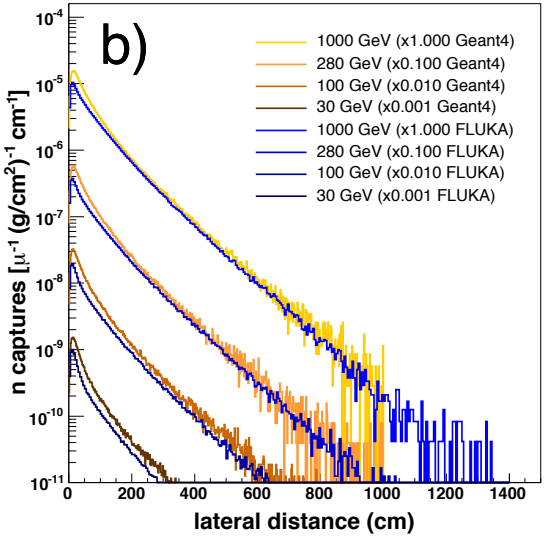


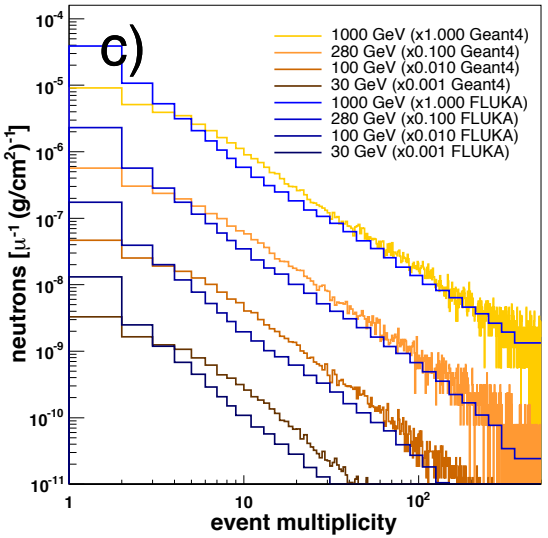
- Geometry above
- Good global flux agreement except for lead
- Some discrepancy w/ heavier elements



Neutron Captures

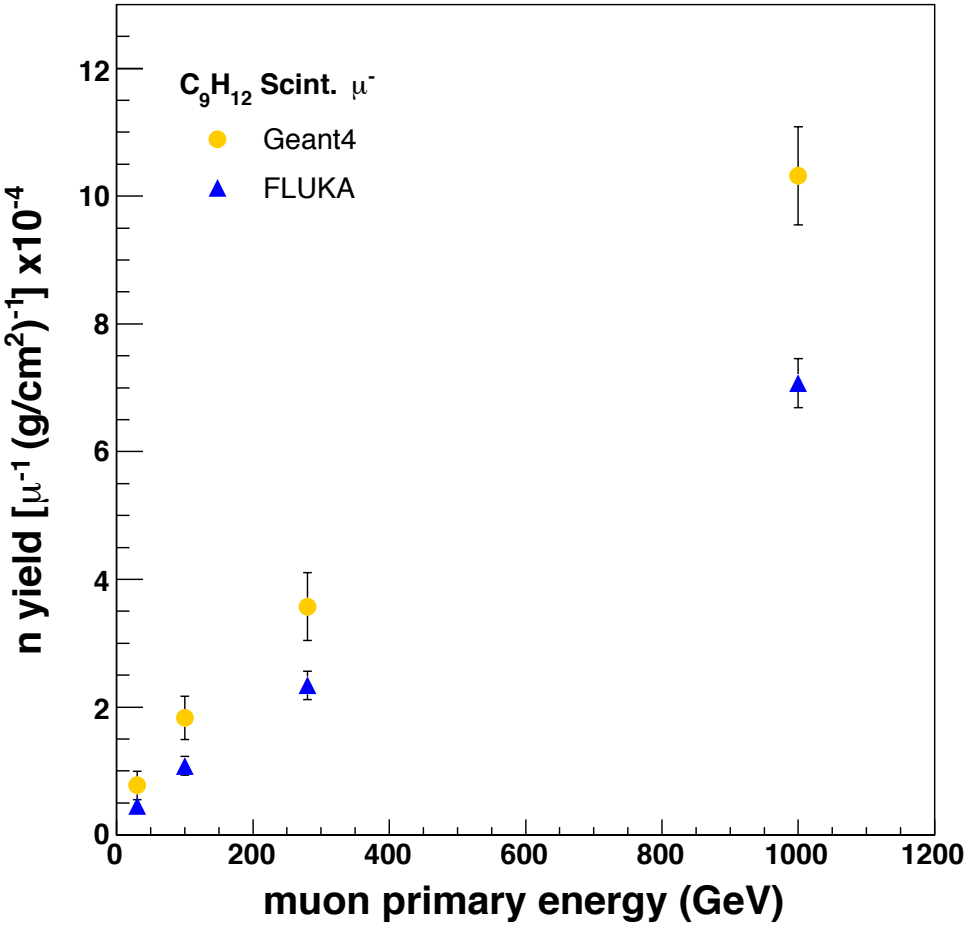






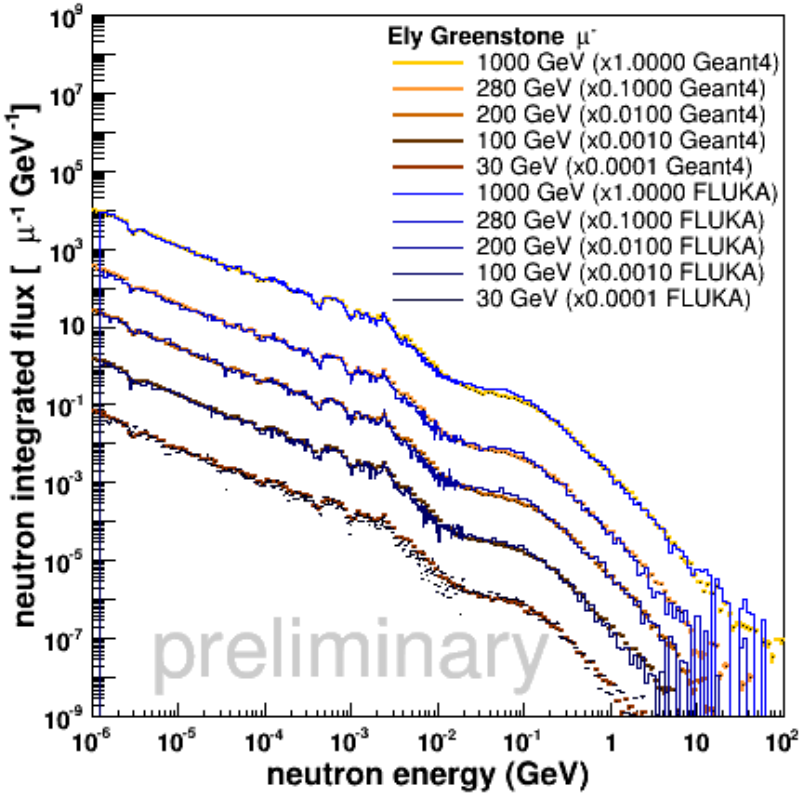
- Overall normalizations and shapes "track" well
- Discrepancies in numbers of captures
- Especially interesting is discrepancies in capture time, radius and multiplicity distributions, this suggests slight differences in microphysics of transport – which could be important for shielding simulations of all types, not just cosmogenics

Neutron Yield Potted Traditionally



- The scintillator material is compared on the traditional plot
- The discrepancies in total neutron **capture** yield are apparent
- Need more points and/or to run with muon energy **distributions** to compare to typical plots for yields at particular depths (which is parameterized by average muon energy)
- Sometimes people claim that the yield should only depend on **average** muon energy but I am skeptical about this, and think it might be an accident for the Gran Sasso depth – we're checking this claim

Greenstone for CDMS Cosmogenics Paper



- Using Geant4.9.5 better agreement than originally obtained by Dennis Wright, running both codes
- Producing the multiplicity distributions for this paper too

Next Steps

- Working on isotope production rate comparisons for various isotopes, especially ^{11}C to give another handle on simulations
- Splitting up the simulations into specific processes like Wang et. al. (2001) did
- Running the simulation for muon energy distributions
- See the LRT 2013 proceedings for more detail: https://zzz.physics.umn.edu/lowrad/flukageant/lrtproceedings