Update on Best Model Germanium Geometry

Shaun Steele and Angela Reisetter

Liquid Argon and Liquid Xenon data from Chao and Monica respectively;
their data quoted from “dm_task_force” page November 24 2013

Live Time

- Current Live Time analyzed: 10.1 yrs

- Data still to be analyzed: ~37 yrs

(This will be analyzed over the next few weeks)

Current Results

- Muons per second per sq meter hitting top of the water tank (inward):

Ge 6.46 E-5

LAr 6.46 E-5

LXe 6.46 E-5

-These are the same because they are all explicitly tied to Chao's MUSUN rate

- Muons per second per sq meter hitting all outer walls of the tank (inward):

Ge 2.21 E-5

LAr 2.11 E-5

LXe 1.76 E -5

-These rates seem to be in pretty good agreement

Current Results

- Neutrons per second per sq meter hitting the top of the water tank(inward):

Ge 1.68 E-6

LAr 1.87 E-6

LXe 2.65 E-6

-These rates are still in pretty good agreement

- Neutrons per second per sq meter hitting all outer walls of the tank (inward):

Ge 3.89 E-6

LAr 1.83 E-6

LXe 1.67 E-6

-Getting about twice as many neutrons here for the Ge as the LAr and LXe

-Was hopping I had counted the neutrons twice (going in and out) but it doesn't look that happened

-Don't really know why there is such a large difference

Current Results

- Neutrons (with KE > 100 KeV) per sec per sq meter entering detector volume:

Ge 6.41 E-7

LAr 5.48 E-6

LXe 9.56 E-6

Current Results

- Events per second that have at least one NR (no other cuts):

Ge 1.34 E-4 (energy deposition > 5 keV)

LAr 1.25 E-5 (energy deposition > 5 keV)

LXe 1.23 E-4 (energy depostion > 5 keV)

-Ge and LXe seem to be in good agreement

- Events per second that have at least one NR and are in Energy ROI:

Ge 4.45 E-6 (energy deposition ROI 10-100 keV)

LAr 1.16 E-7 (energy deposition ROI 50-100 keV)

LXe 4.8 E-5 (energy depostion ROI not listed)

Note: My numbers for NR's in ROI are incorrect. Should still be higher than LAr though because of larger ROI.

Current Results

- Rate of Single WIMP candidates in entire volume (All analysis cuts except fiducial and veto):

Ge 1.57 E-8

LAr 2.9 E-9

LXe 1.6 E-8

Note: Geometries use different detectors so should expect these rates to be a little different

- Veto ratio for multiple NR. (not applicable for liquid argon)

Ge 595:3

LXe 42346:7 (Muon entering water tank must have at least 1 GeV energy)

Plans for the Next Month

- Update the two “Events per second…” rates and compare
- Download and analyze the remaining data (~37 years) and compare
- Then, start calculating the errors for this data