

Weekly report

14/Oct/2021

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Tasks ongoing

- ◆ Figures for ZDC write-up for the ECCE proposal
 - **First version of figures and captions are ready.**
- ◆ Preparation of ZDC reconstruction codes in Fun4All
 - Got information, but no progress yet. **To do...**
- ◆ Analysis for CC cross section measurement.
 - Distributions/resolutions using calorimeter clusters only are at my hand.
 - Developing codes to use both tracks and clusters. **Ongoing...**
- ◆ Photoproduction MC.
 - PYTHIA 600K events for ep 5x41, 10x100, 18x275 are generated.
 - MSTP(14) = 30, but direct photons only??
- ◆ Description of MC samples in the inclusive PWG's part for the ECCE proposal.
 - **To do...**

ZDC figures and captions for write-up

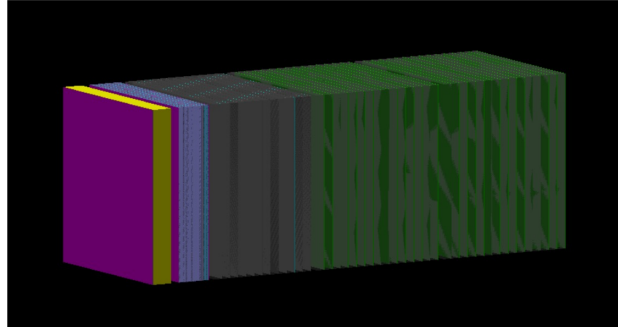


Figure 1: ZDC design. Particles come in from the left side of the figure. The detector consists of a 7 cm crystal layer (yellow) with a silicon pixel layer attached (magenta), 22 layers of Tungsten/Silicon planes (light purple), 12 layers of Lead/Silicon planes (gray), and 30 layers of Lead/Scintillator planes (green), corresponding to the thickness of $8X_0$, $22X_0$, $2\lambda_I$, and $5\lambda_I$, respectively.

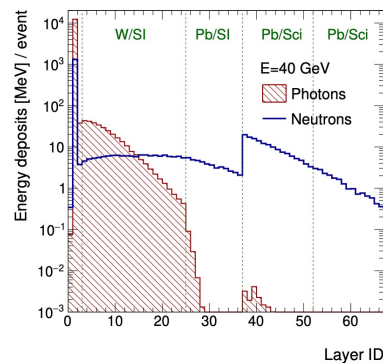


Figure 2: Simulated energy deposits on each layer of active materials, namely a silicon, crystal, or scintillator layer, shown for 40 GeV single photons and single neutrons. The first silicon layer has the layer ID = 0 and the next crystal layer has ID = 1. Other detector parts are indicated in the figure. The shown energy deposits are averaged values for an event, where a single photon or a neutron is shot on ZDC by a particle gun.

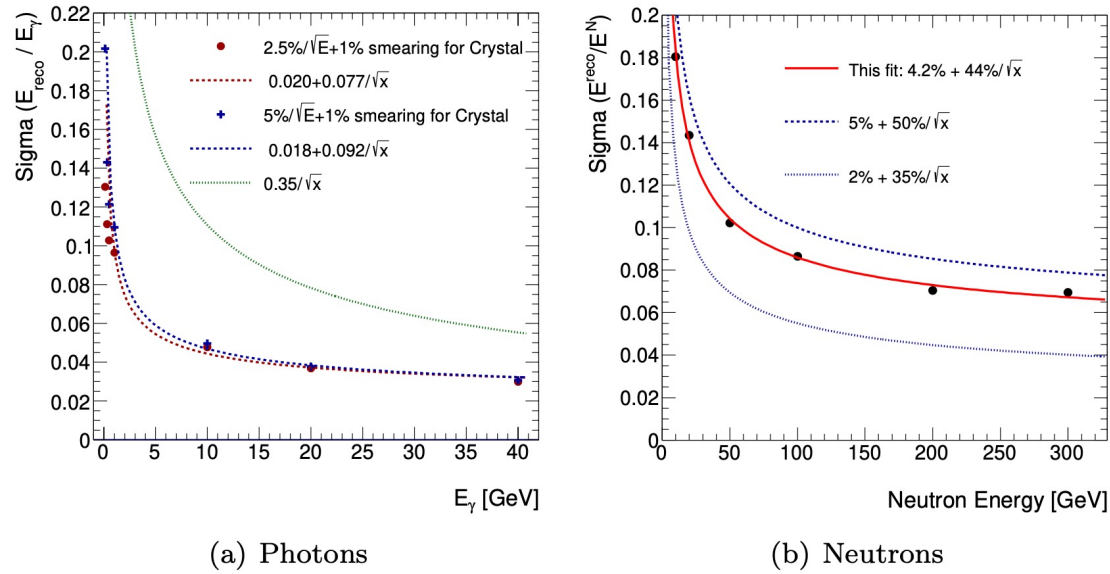


Figure 3: Estimation of the energy resolution for (a) single photons and (b) single neutrons. The photon or neutron energy is reconstructed from the deposited energy in each active material. No readout system is in the simulation. For the crystal layer, the energy is smeared by $2.5\%/\sqrt{E} + 1\%$, which is compared to $5\%/\sqrt{E} + 1\%$ smearing for the photon case. Estimated resolution is fitted by a function of the induced energy and compared to the physics requirements, $35\%/\sqrt{E}$ for photons and $50\%/\sqrt{E} + 5\%$ for neutrons.