

FCalPulse modeling progress report

M. Manashova 20/06/2022

Geometry of LAr and foil



Beta spectrum of Sr-90 and Y-90



Normalized energy spectrum of β -particles emitted by the serial decay of 90Sr and 90Y

Dixon, J., Rajan, A., Bohlemann, S. et al. Evaluation of a Silicon 90Sr Betavoltaic Power Source. Sci Rep 6, 38182 (2016). https://doi.org/10.1038/srep38182



The maximum energy of the β-particle is ~2.2 MeV, which corresponds to the end-point energy of the β-decay of 90Y; -the average energy of the β-particle is ~0.3 MeV.



Beta spectrum of Sr-90 and Y-90



 β spectrum of Sr-90 recorded with the scintillation counter.

Strontium-90 is a man-made isotope with a half-life of 28.5 years. It decays emitting an electron with a maximum energy of 546 keV (β decay) into yttrium-90. The latter decays through β decay with a maximum energy of 2274 keV into zirconium-90 with a half₁life of 64.1 hours.

The data are taken from: The Lund/LBNL Nuclear Data Search Version 2.0, February 1999 S.Y.F. Chu 1, L.P. Ekstroem 1,2 and R.B. Firestone 1 1 LBNL, Berkeley, USA 2 Department of Physics, Lund University, Sweden http://www.ld-didactic.com/



Divide LAr into phi-Z (8x24)





Cell visualization



y

Cell visualization



Cell visualization

Foil in cell #7-14



cell 3 cell 2 h3 8 h2 17 4 3.5 3.5 2.5 1.5 1.5 1.5 Entries 8 Entries Mean 0.511 Mean 0.524 7 entries 9 Std Dev 0.1333 0.01902 Std Dev 5 4 3 2 0 ^{3.5} ⁴ E_{tot_dep}, MeV 0.5 1.5 2 2.5 3 3.5 0.5 1.5 2 2.5 3 1 4 1 E_{tot_dep} , MeV cell 4 cell 5 h4 h5 22 37 Entries 30 Entries 58 0.523 20 Mean Mean 0.5693 Std Dev 0.09411 Std Dev 0.2489 entries entries 52 18 16 20 14 12 15 10 8 10 6 E 4 5 2 00 2.5 3 $E_{tot_{dep}}^{3.5}$, MeV⁴ 0.5 2 1.5 0.5 1.5 2 2.5 3 3.5 4 1 E_{tot_dep}, MeV









Total deposited energy distribution

