

Boundary Dose Estimates

Ciprian Gal, Zuhail Seyma Demiroglu, Vassu Doomra

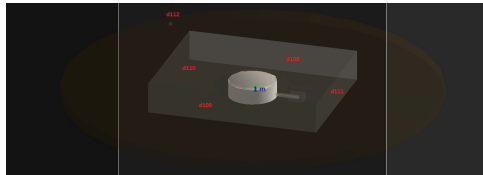
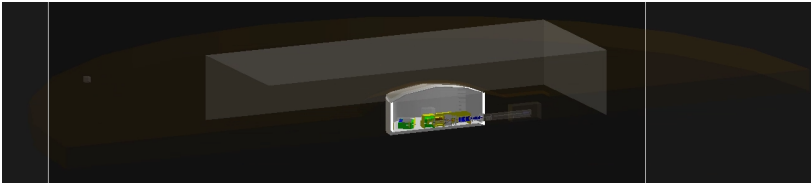
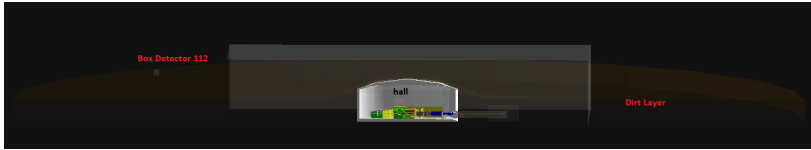
Mississippi State University, Stony Brook University

March 25, 2022

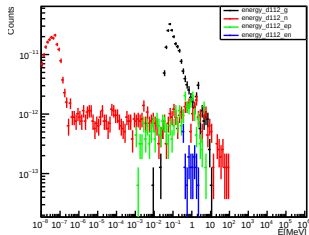
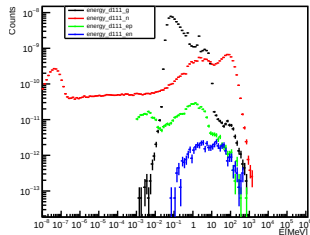
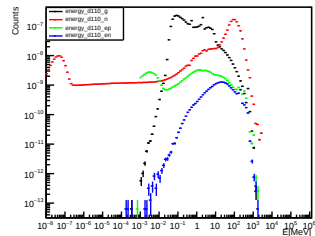
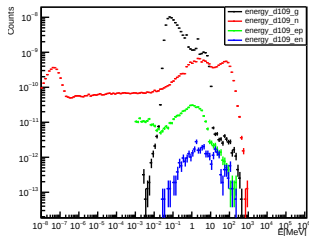
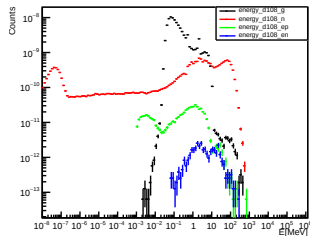
Overview

- Details of the implementation of the FLUKA model into remoll can be found at <https://moller.jlab.org/cgi-bin/DocDB/private/ShowDocument?docid=879>.
- From the full remoll simulation with the new geometry, we created a skim tree that only contained hits on the cylindrical virtual detector (det99) and the roof detector (det101). In creating the skim tree, we only selected neutrons with energy greater than 50 MeV and $e^-/e^+/\gamma$ with energy greater than 500 MeV.
- Additionally, the particles going towards the dump were not included. The idea was to have a boundary dose estimate with contributions from inside the hall only.
- We have defined 5 detectors in this analysis. d108 (to the beam left), d109 (to the beam right), d110 (on the top), d111 (to the right of dump) and d112 (a box detector in the shape of a cube with 3m side). Please refer to the next slide for a visual of these detectors in the simulation geometry.

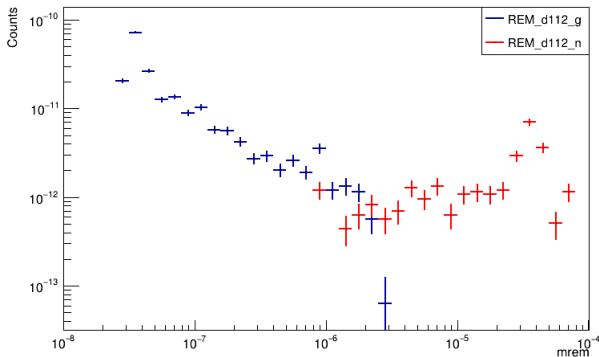
Location of Various Detector Planes



Energy Distributions on the Detector Planes



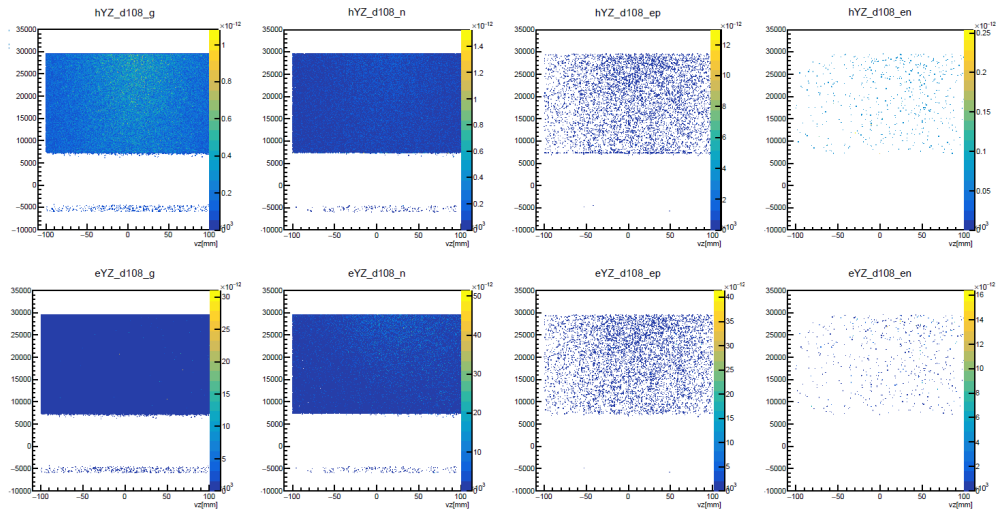
REM Distribution on the Box Detector (112)



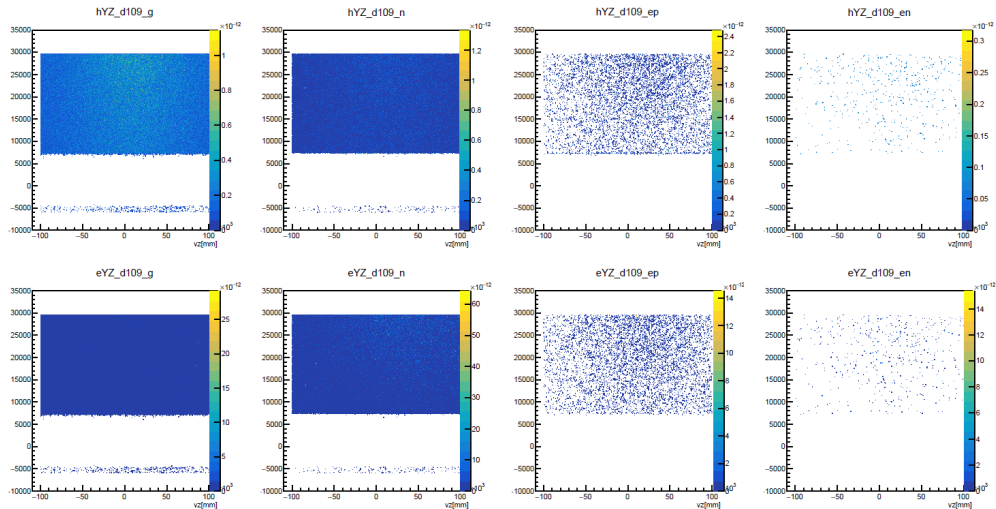
We used the `GetMREM()` function defined in `radDamage.cc` macro to obtain this distribution. Neutrons cover a wide range of mrem values.

Back Up

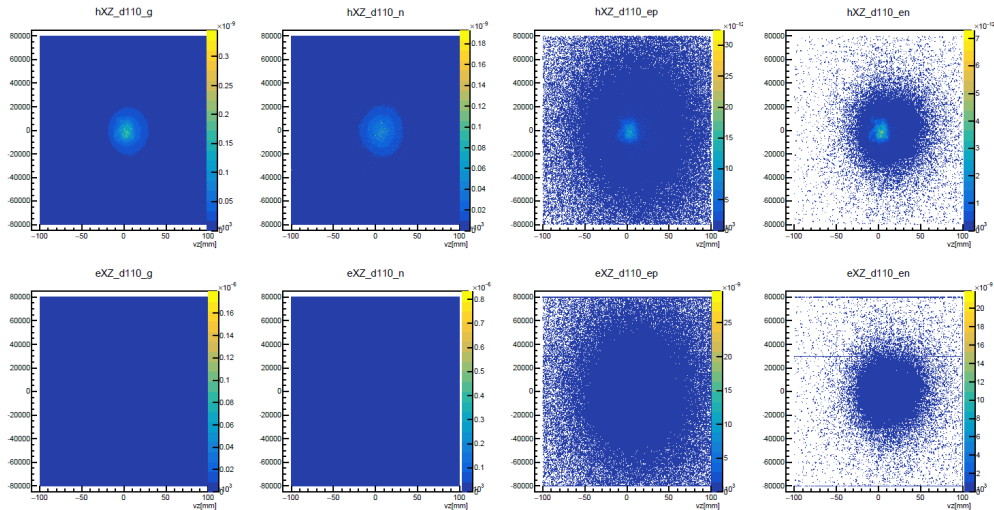
Spatial Distributions on Det108



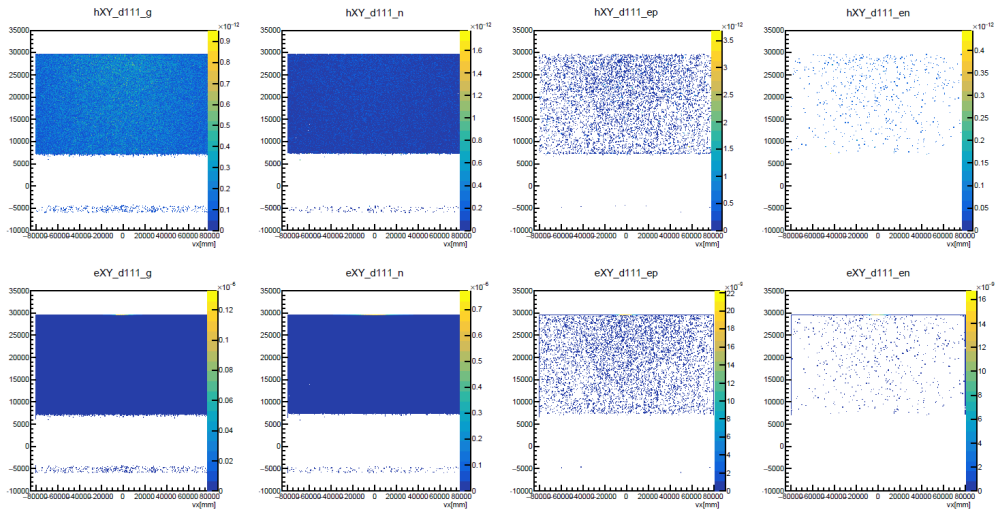
Spatial Distributions on Det109



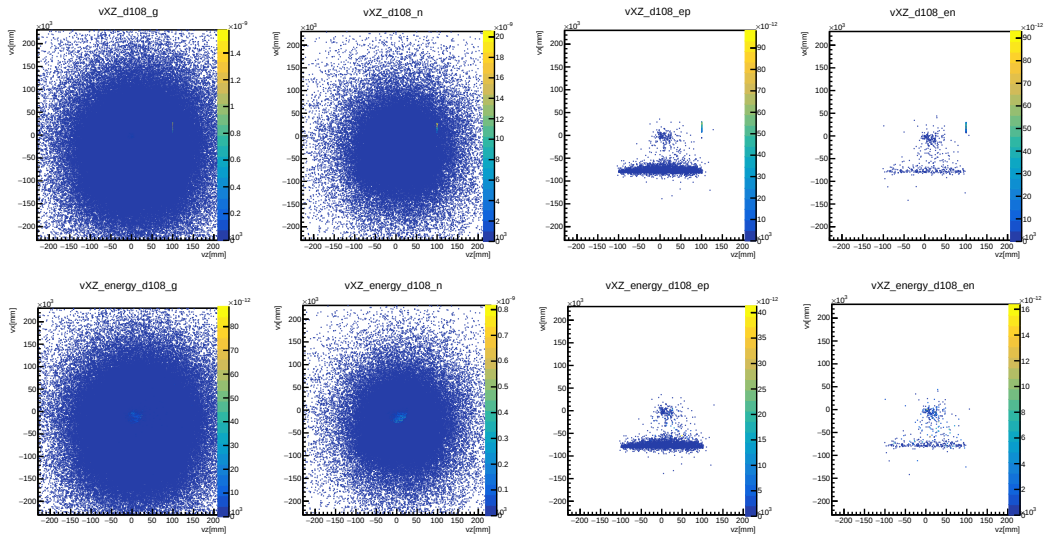
Spatial Distributions on Det110



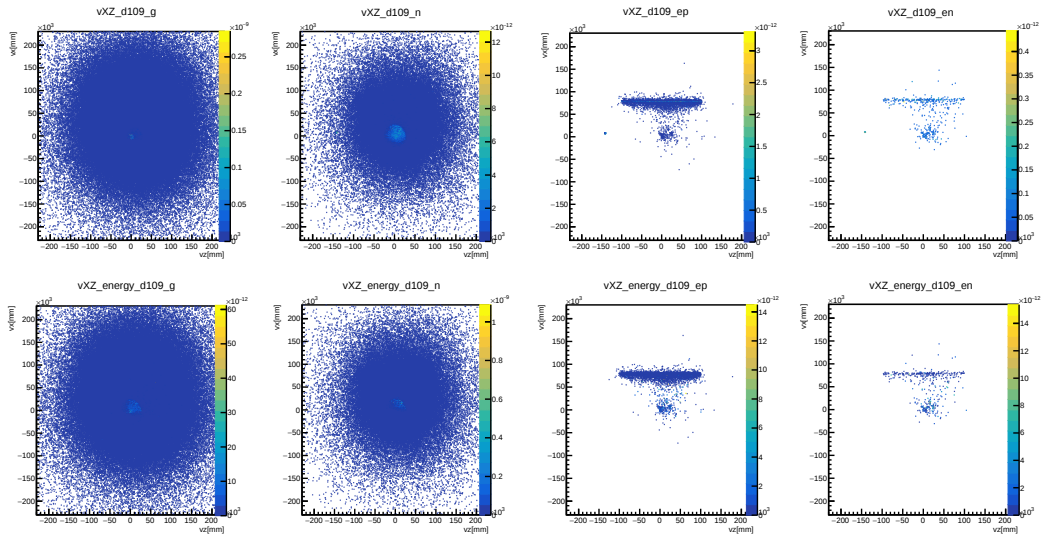
Spatial Distributions on Det111



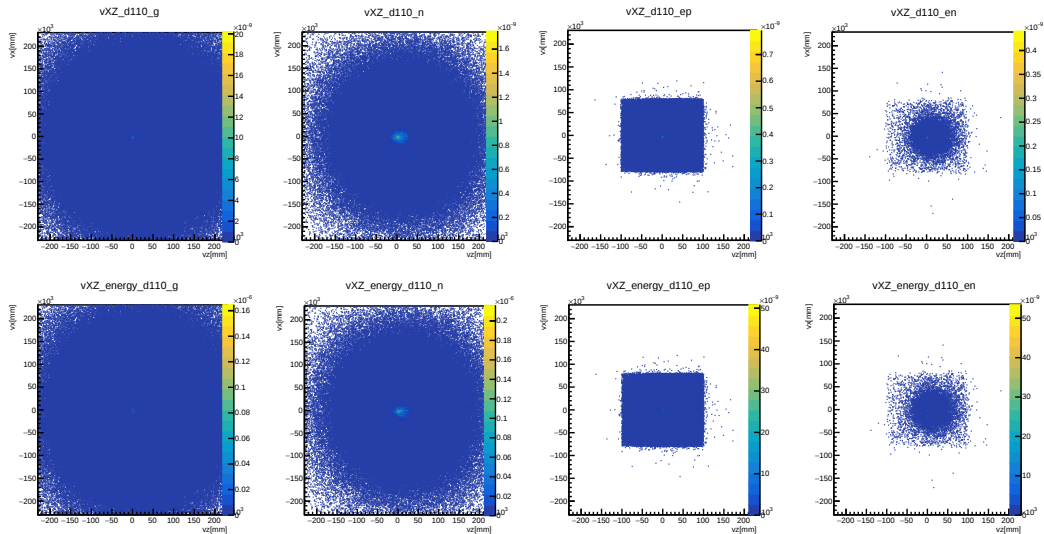
Vertex Distributions on Det108



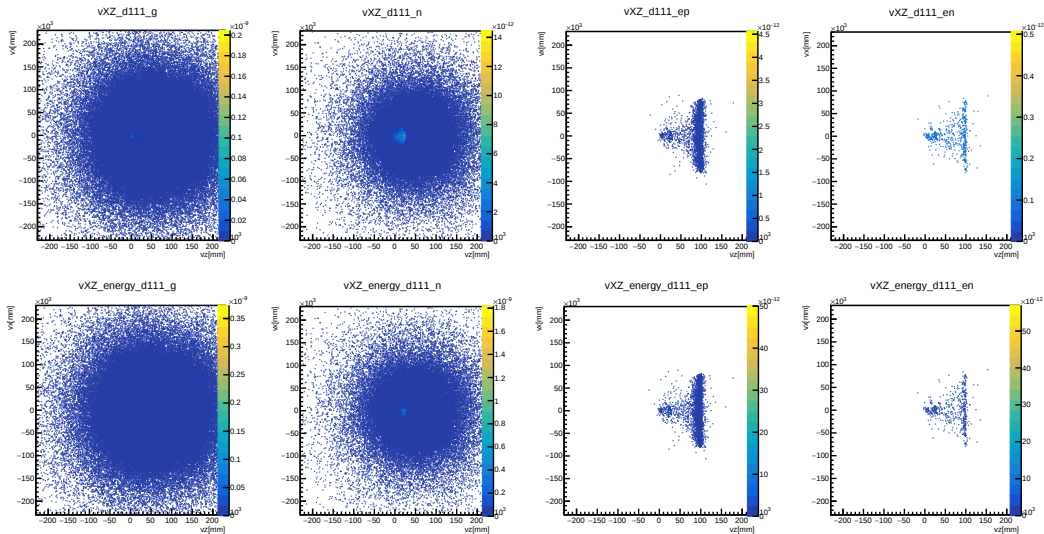
Vertex Distributions on Det109



Vertex Distributions on Det110



Vertex Distributions on Det111



Vertex Distributions on Det112

