NPOD background simulation studies update

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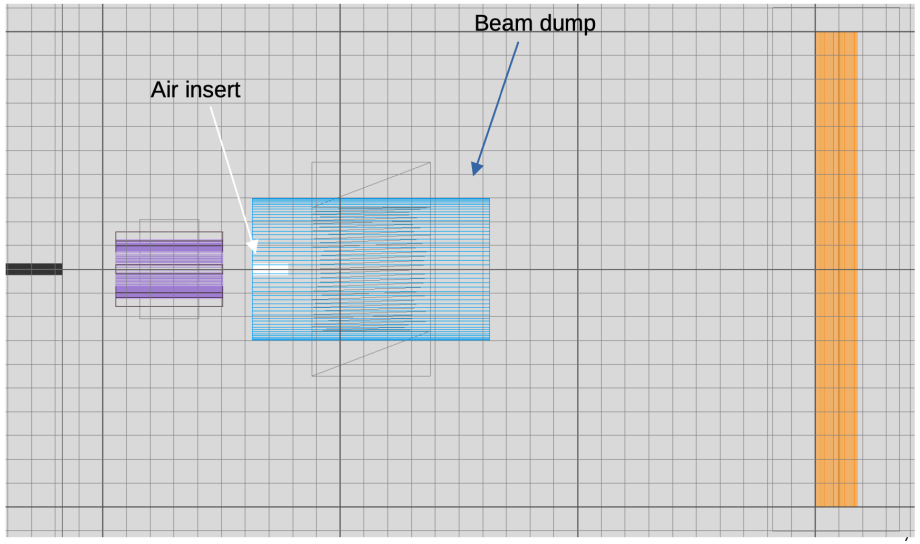
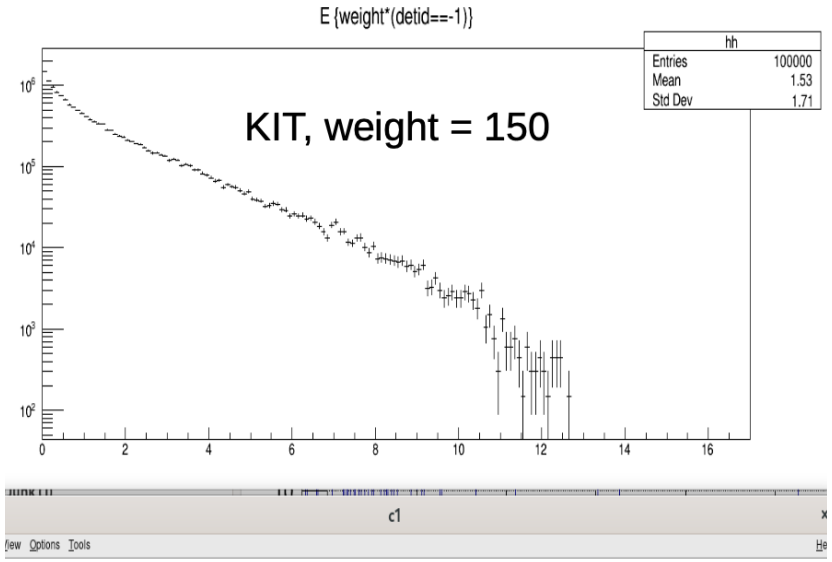
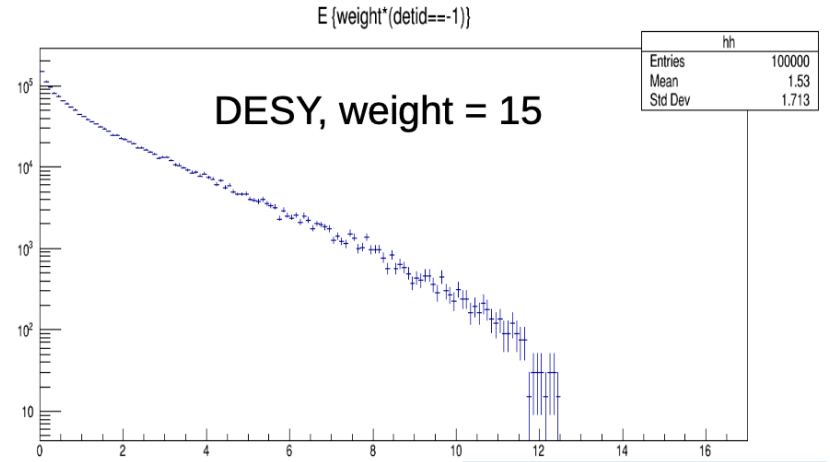
Previous results

- Compared previous results with the G4 simulations available in NAF-LUXE
- Results agree with a factor 10 difference due to the number of MC files used in G4 simulations at KIT
- Previous results included an air insert. This was not present in the NPOD paper



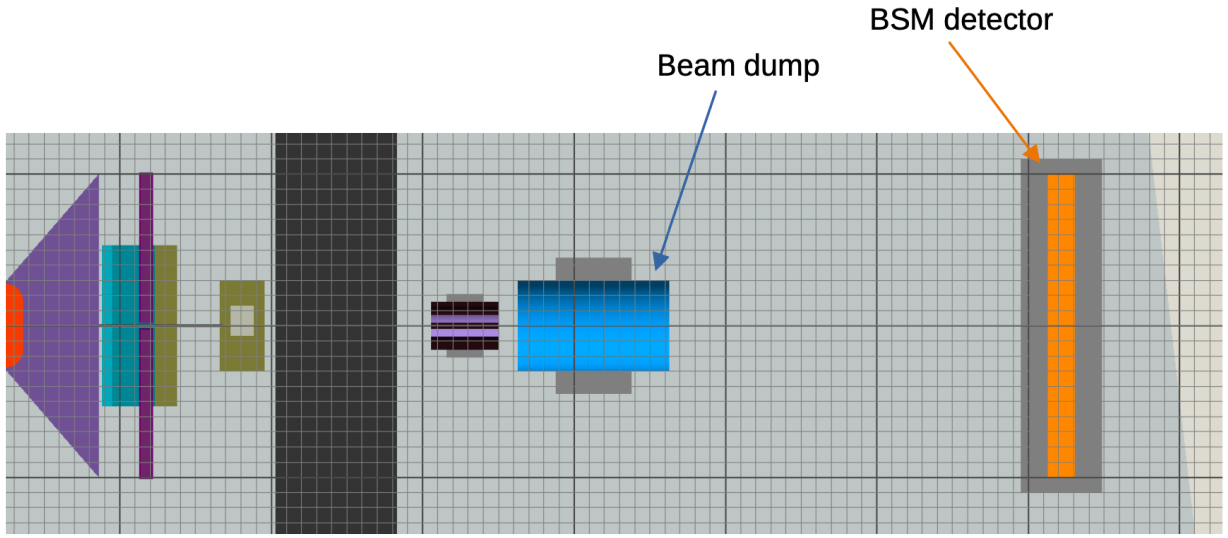




(Thanks Sasha!)

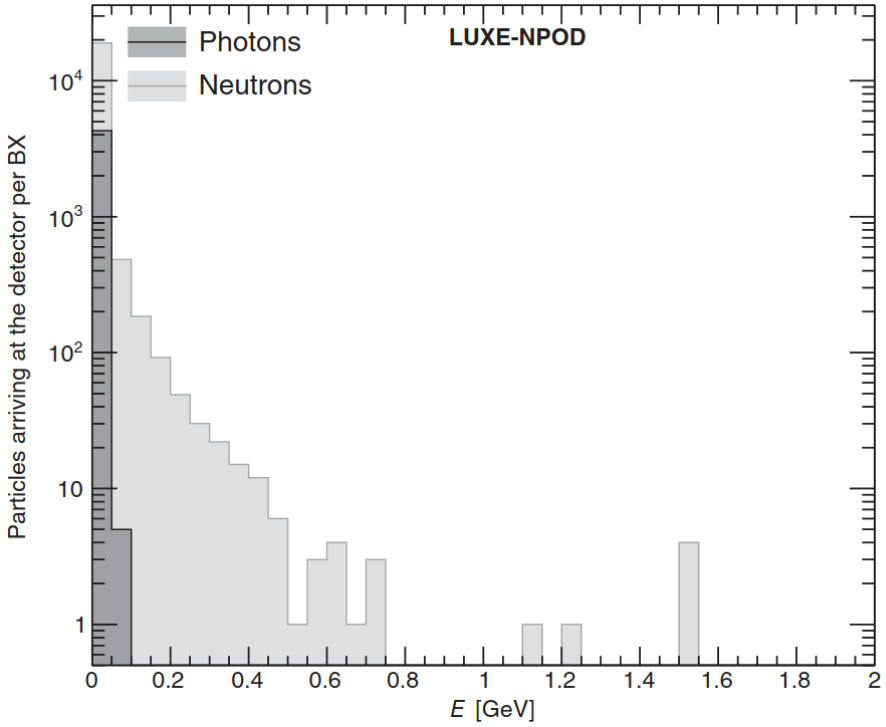
Current simulation: general cuts applied

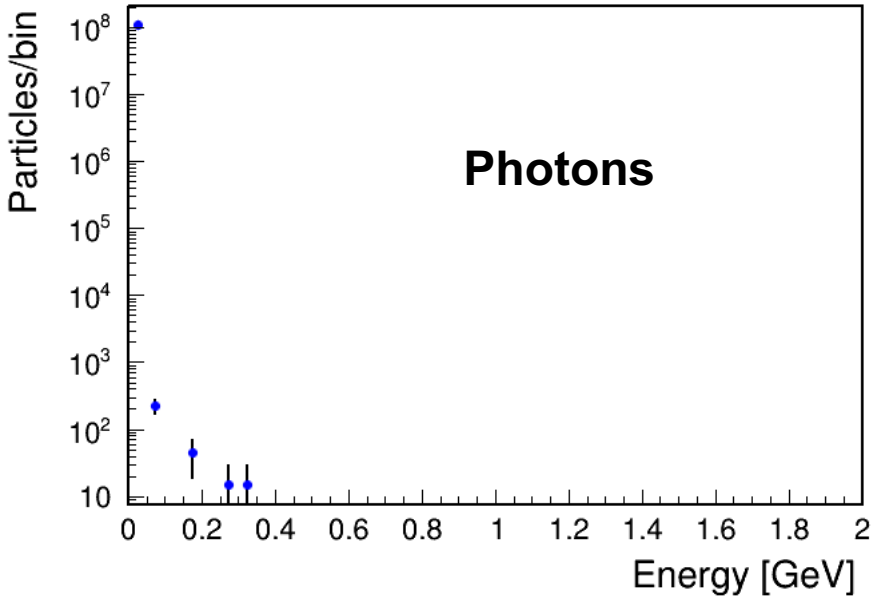
- No air filter
- geometry settings with the distance of 2.5 m between the beam dump and BSM detector
- pdg==22 ; pdg==2112
- detid==9000
- sqrt(x*x+y*y)<1000.0
- abs(z-17130.0)<0.1 (front side of the detector)

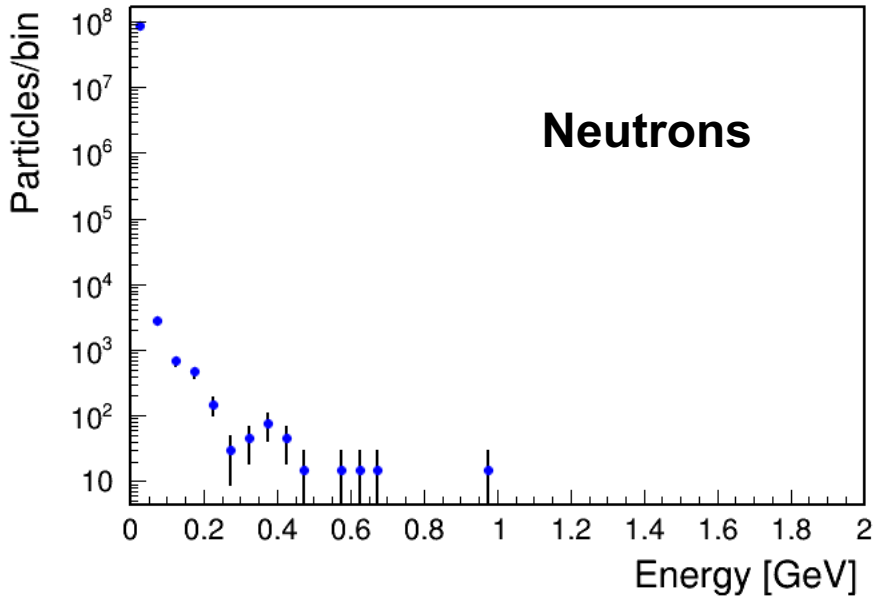


The following plots correspond to 1BX, dump material Tungsten and length 1m

Energy spectrum

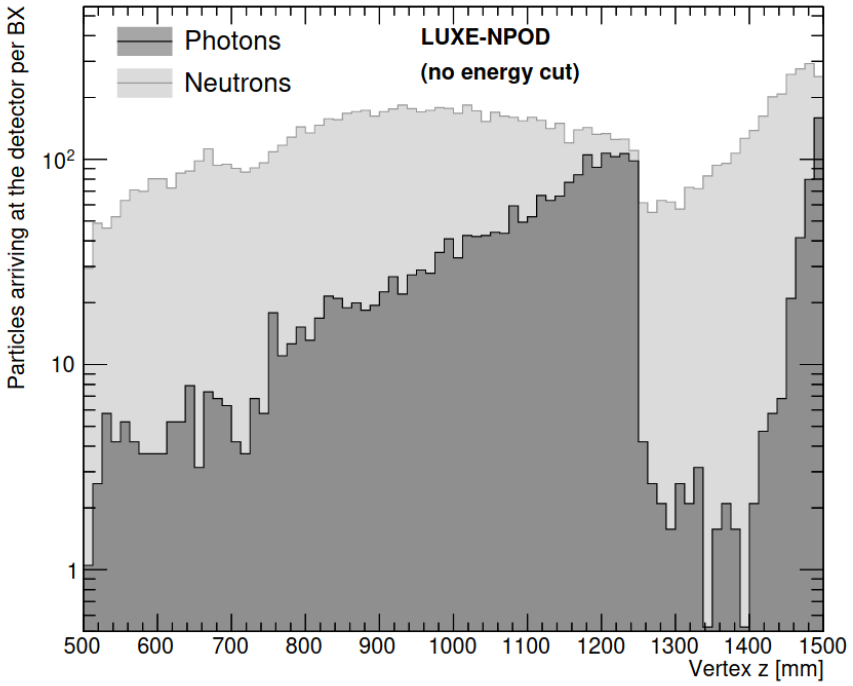


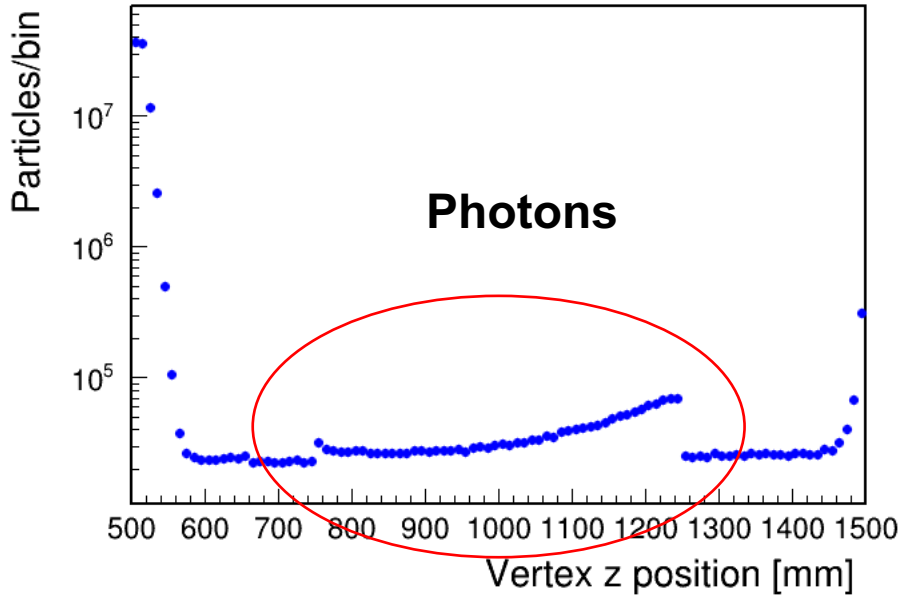


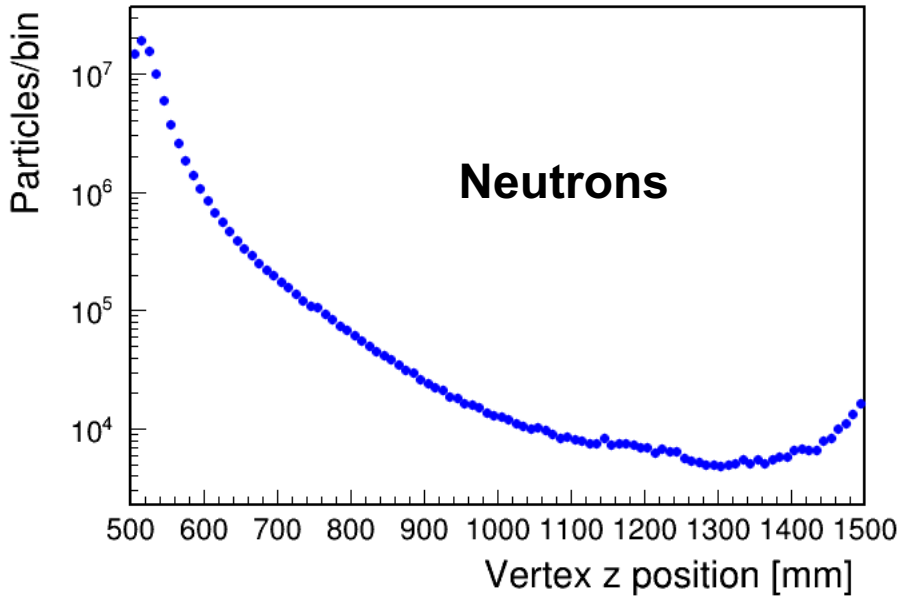


- Plot produced using: `(E>0)*weight`
- After applying the cut sqrt(x*x+y*y)<1m low-E photons decreased in higher E-bins
- Lots of low-E photons in first bins persist

Vertex Z distribution







- Plot produced using: `weight`
- Ommitted cut `sqrt(vtxx*vtxx+vtxy*vtxy)<300.0`
- Concrete structure seen for photons

Conclusions

- Strong presence of low-E photons persists. This affects the energy distribution and z-vertex position, in particular for neutrons
- BSM calorimeter concrete structure seen for photons when ommiting cut in vtxx, vtxy
- Normalisation and low-E photons presence yet to be understood

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Thanks!