Energy Deposition in the Kaon Production Target using FLUKA

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First approximation FLUKA model for γ-beam and KPT.

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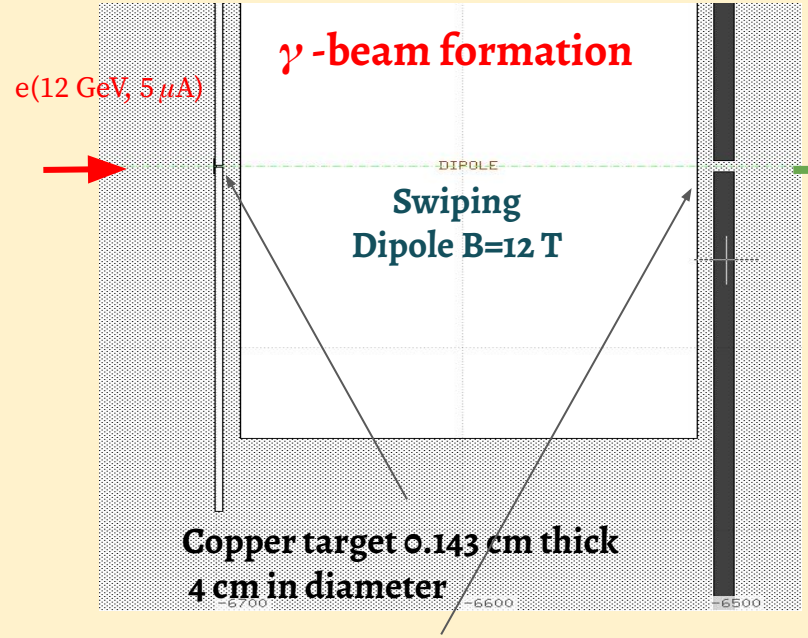
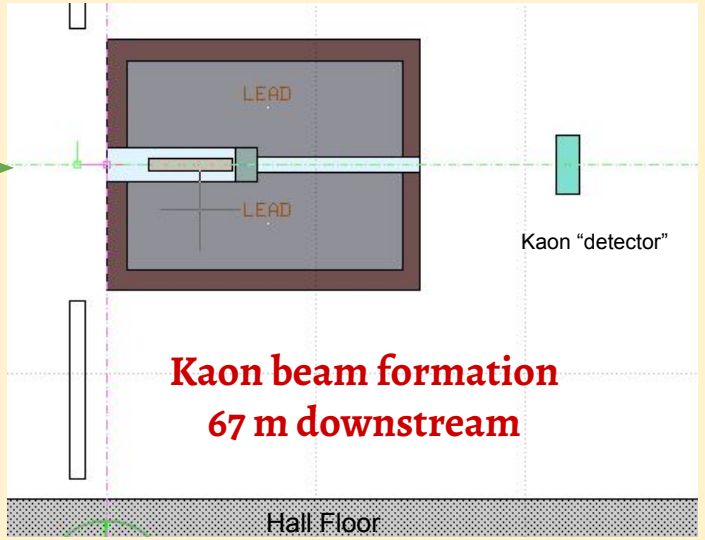


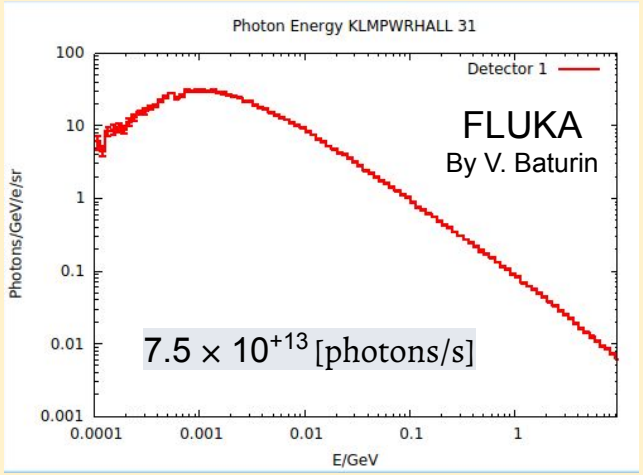
Photon beam

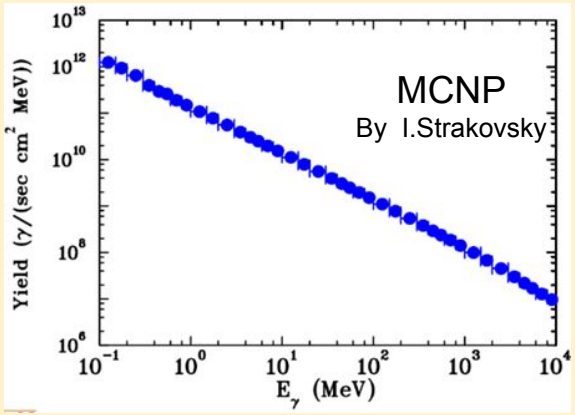


"Black hole collimator" D=6 cm to cancel particle tracking and save calculation time.
Does not affect the KLM acceptance!
No air in the Hall!

- No air in the Hall.
- Beryllium cyl. D×L = 6 × 40 cm × cm.
- Lead cylinder 100 × 132
- Tungsten cylinder 16 × 10
- Borated Polyethylene 120 × 150 ; Mass C/H/B= 56/14/30
- Hole upstream KPT 16 × 72 ; air added inside
- Hole downstream KPT 7 ×79 ; air added inside

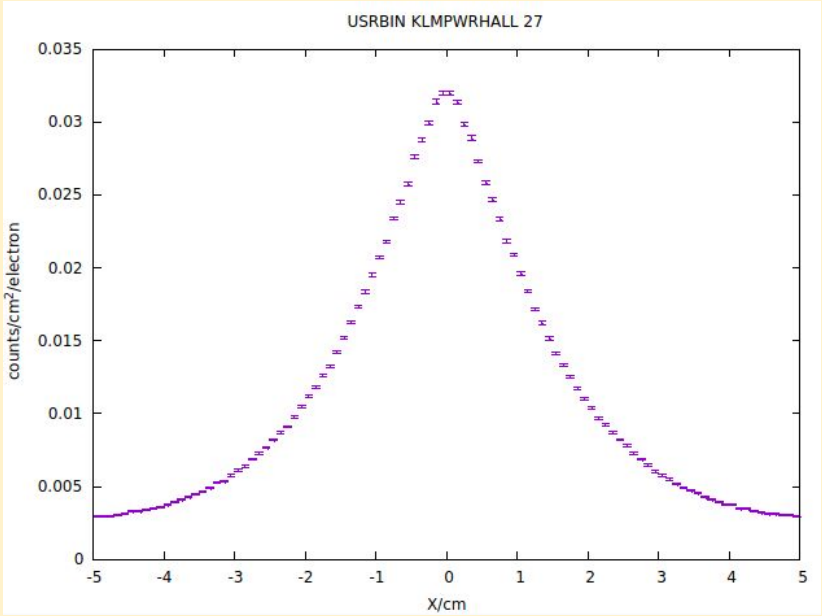
Energy Spectrum of the Secondary Photon Beam.





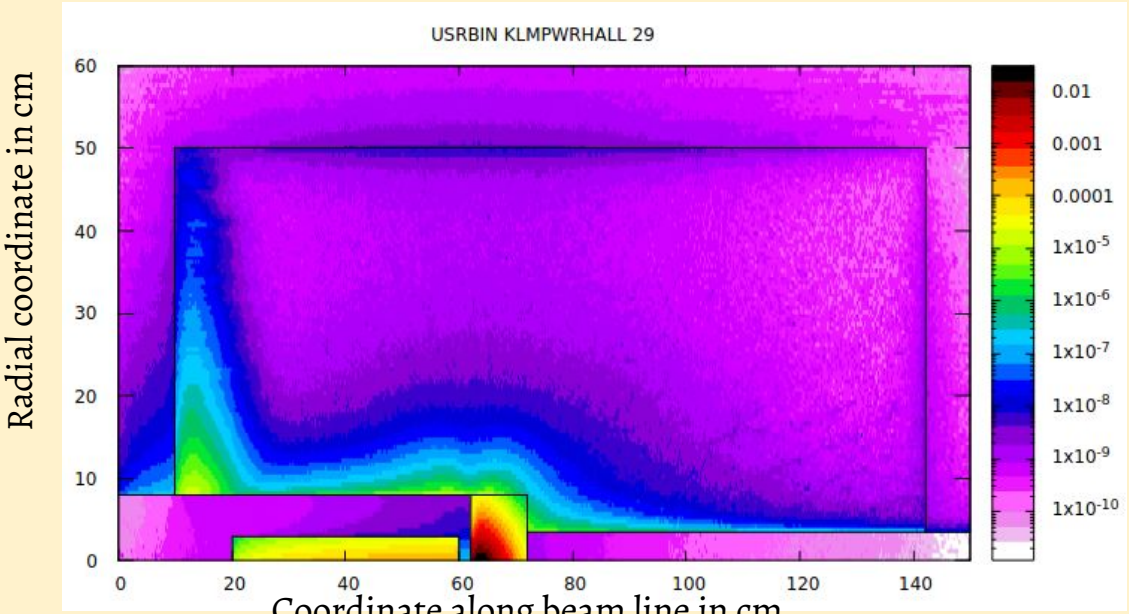
- The integrated flux on the Be cylinder at 5 μA of primary **e**-beam is 7.5 E+13 [photons/s] (±2%) may be used for normalisation to MCNP calculations with primary γ-beam.
- Noticeable difference in energy spectra of FLUKA vs MCNP below 1 MeV is not critical.

Photon Beam Profile across the Be cylinder of KPT



- Major part of the photon beam hits the Be cylinder (-3 cm < x < 3 cm); vertical y-distribution looks the same.

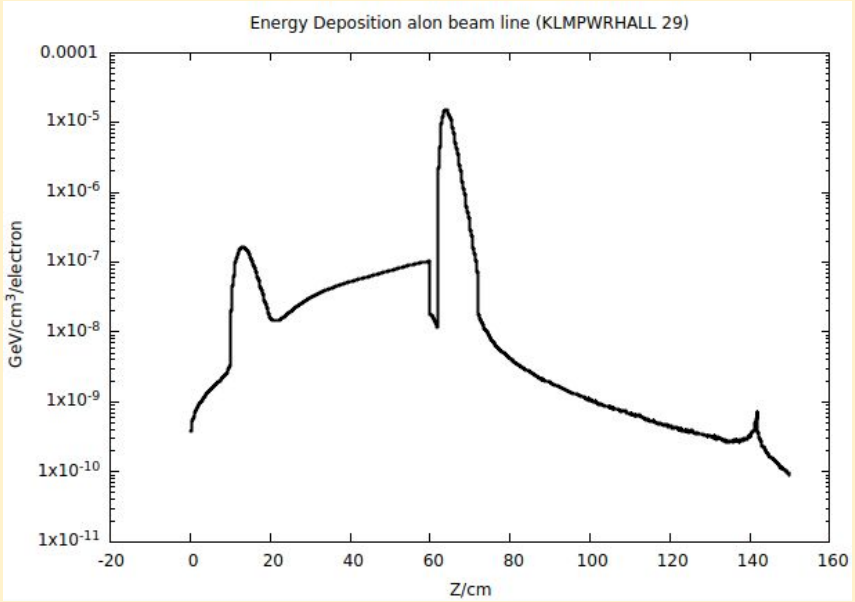
Energy Deposition Map.

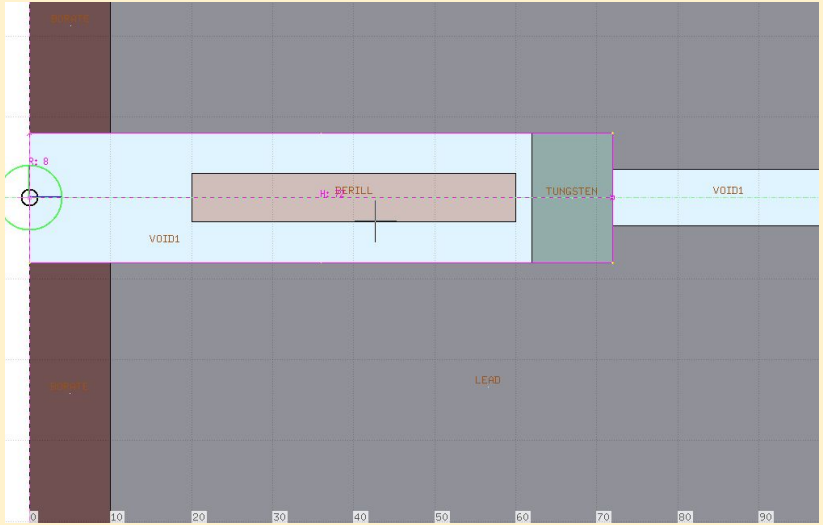


Energy deposition
In
GeV/cm³/electron

- To get Power Density in [GeV/cm³/s] - scale by the electron beam intensity in [electrons/s].
- To get in Watts/cm³ - additionally scale by 1.6022E-10 [J/GeV].
- The corresponding numerical table is provided as a text file.
- Hot spot in the Tungsten cylinder.

Energy Deposition Profile along the KPT axis @ R<3 cm





- There is a very hot spot in the Tungsten cylinder

Outlook

- Calculation time is of 24 hrs per 80000 primary electrons.
- Do we need a more realistic beam line (pay by calc. time)?
- Simulation with finer granularity is in progress.

  Additional numerical file will be provided for

  20 < Z < 80 cm in 1 cm bins
  0 < R < 10 cm in 1 cm bins