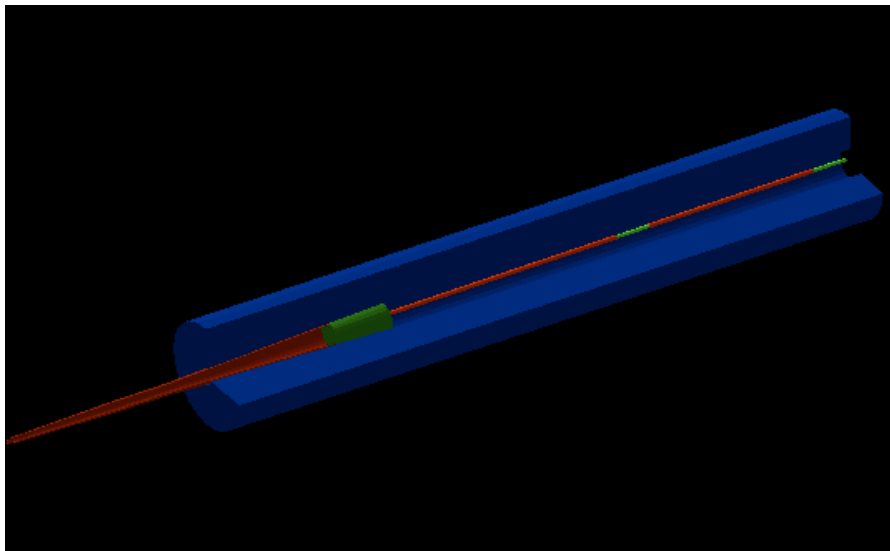


Backgrounds from beam losses in the ILC extraction line

Setup BDSIM on GRID



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Resume



- Introduction
- The disrupted beam and power losses along the 20 mrad extraction line
- “SID” with the 20 mrad in BDSIM
- Backscattered photons
- Backscattered electrons
- Conclusion

- BDSIM on Parachute ...
or how I use BDSIM onto the Grid

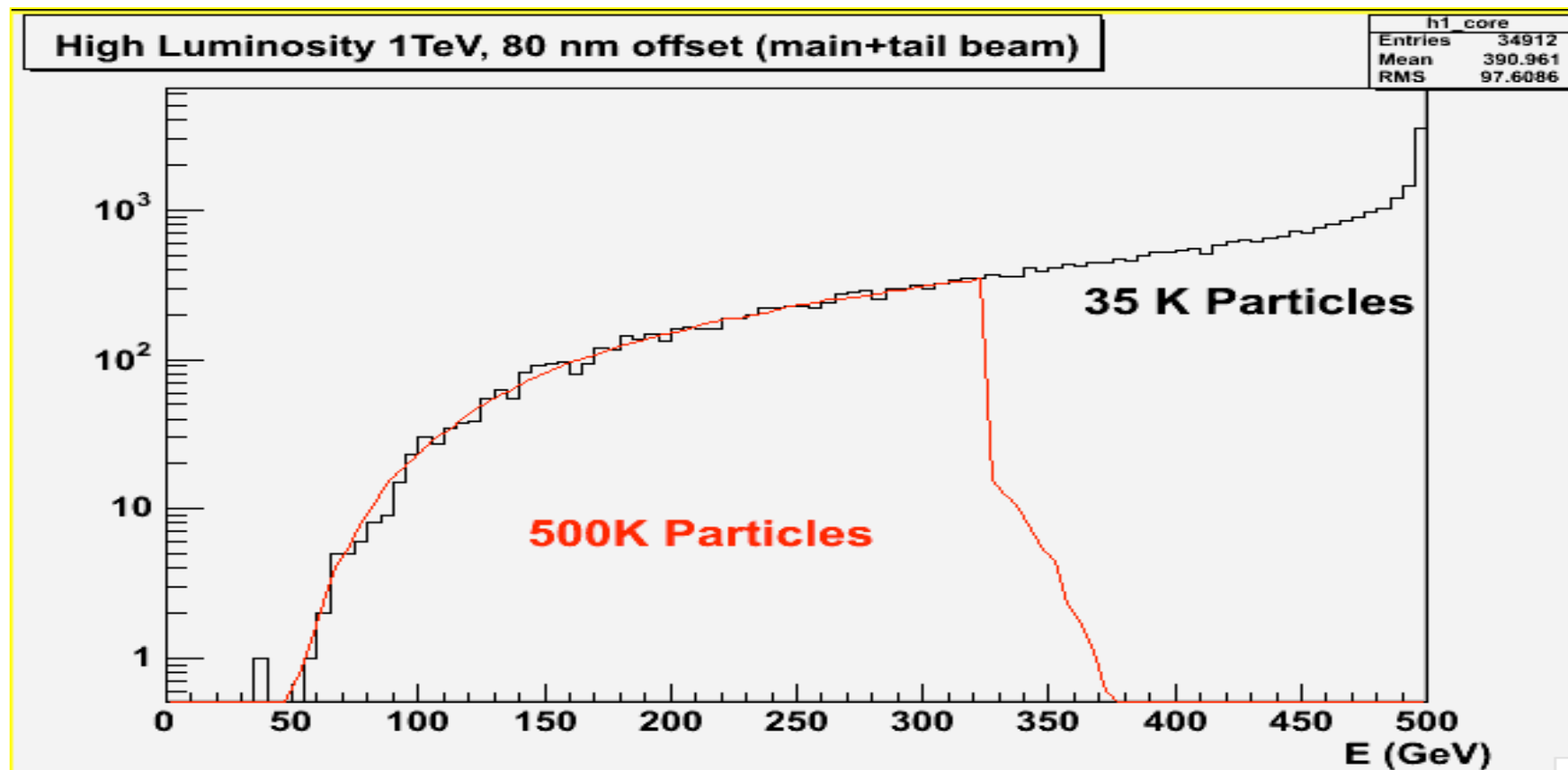


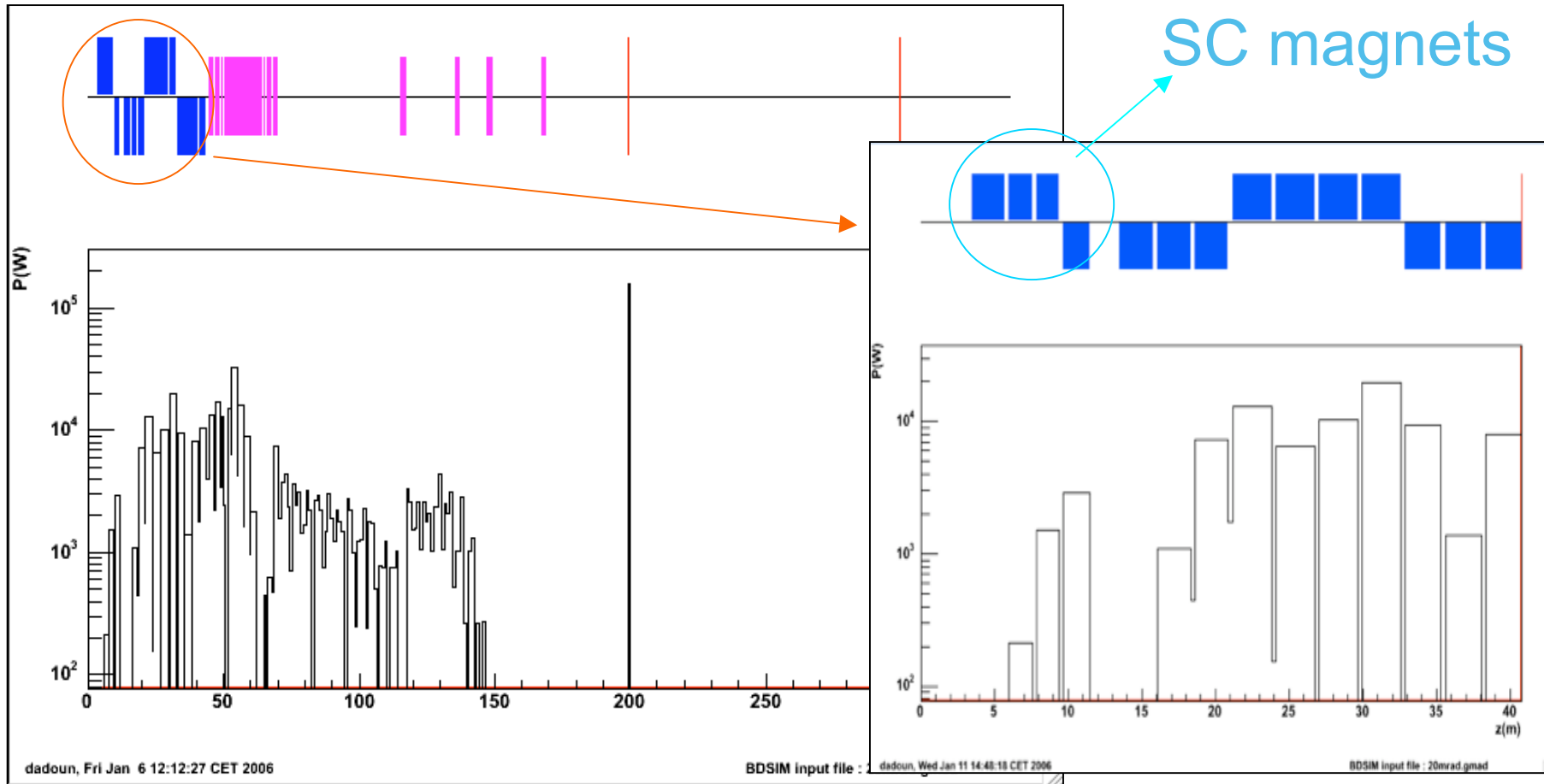
Introduction



- Depend on the beam parameters set, the post collision beam could be very degraded (beamstrahlung photon)
- Need to extract those beams and transport them with the minimal losses to the dump
 - **In any case we will have some losses**
 - damage on beam magnet and specially the SC magnets
 - background generation
- One of our goals:
 - **Evaluate the backscattered particles into the detector region using BDSIM toolkit (Geant4 based)**
 - nb: 4detectors concept X 3(4) extractions line

- To maximize the power losses and the secondaries I used the High luminosity beam parameters @ 1TeV machine with $\Delta y=80$ nm beam offset (worst case not really realistic)
- 15 MW post collision beam to extract (\sim kW/m in the SC magnets !!!)

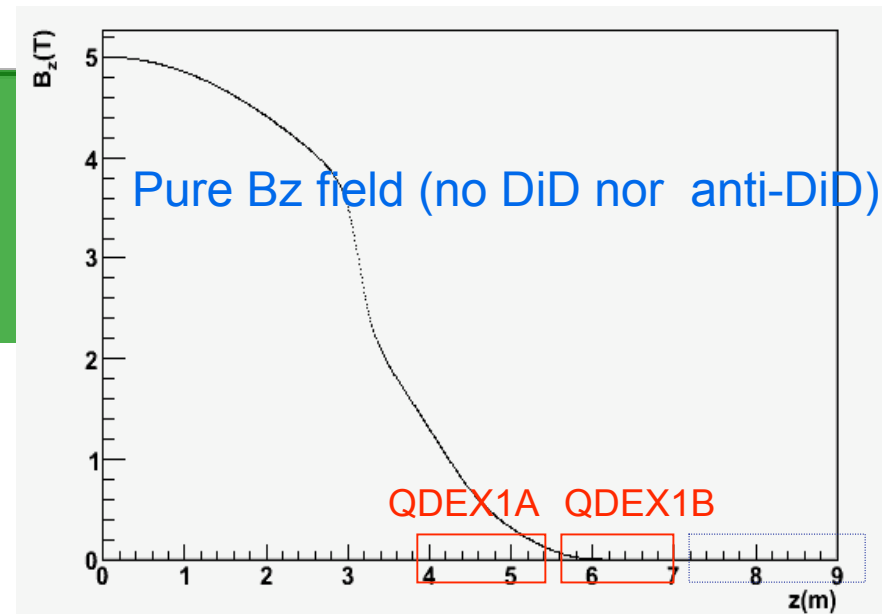
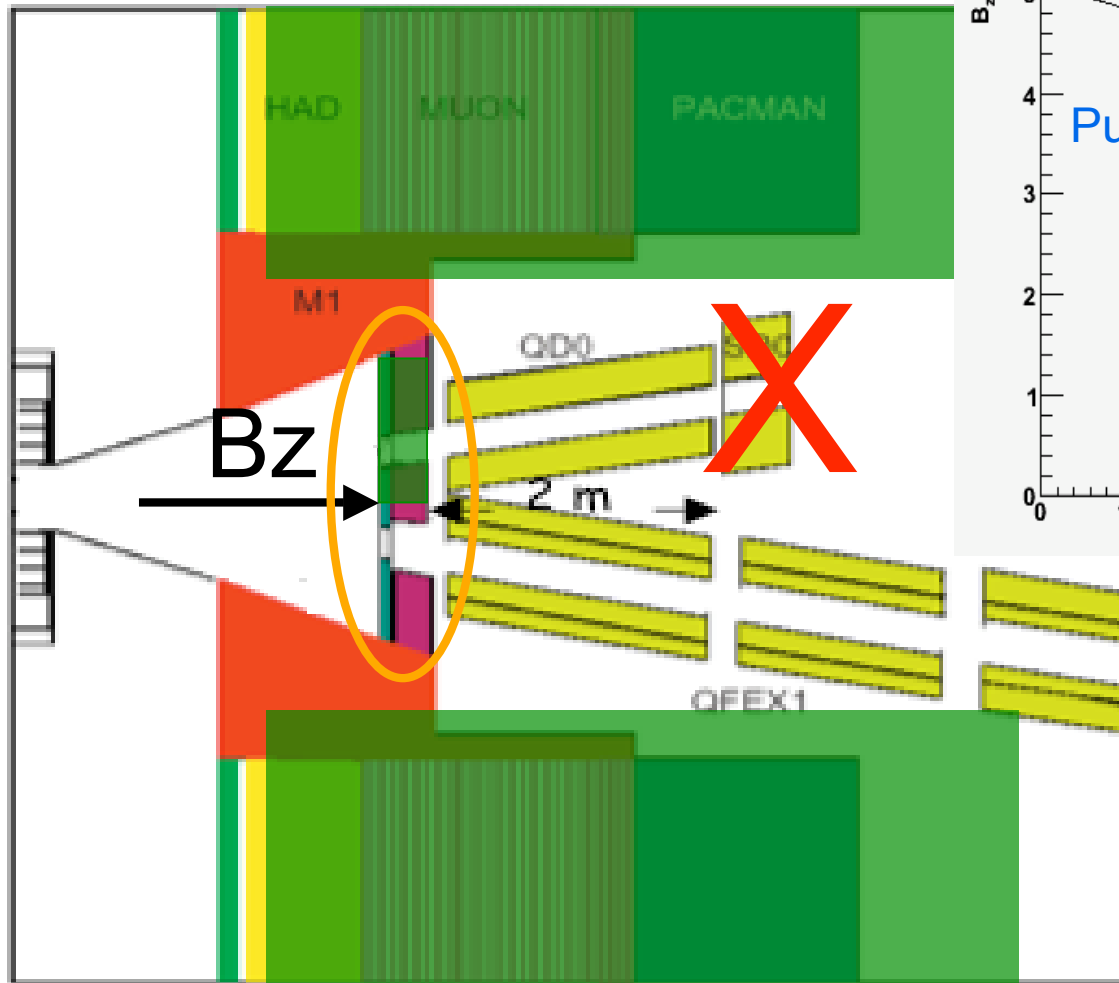




Comment:

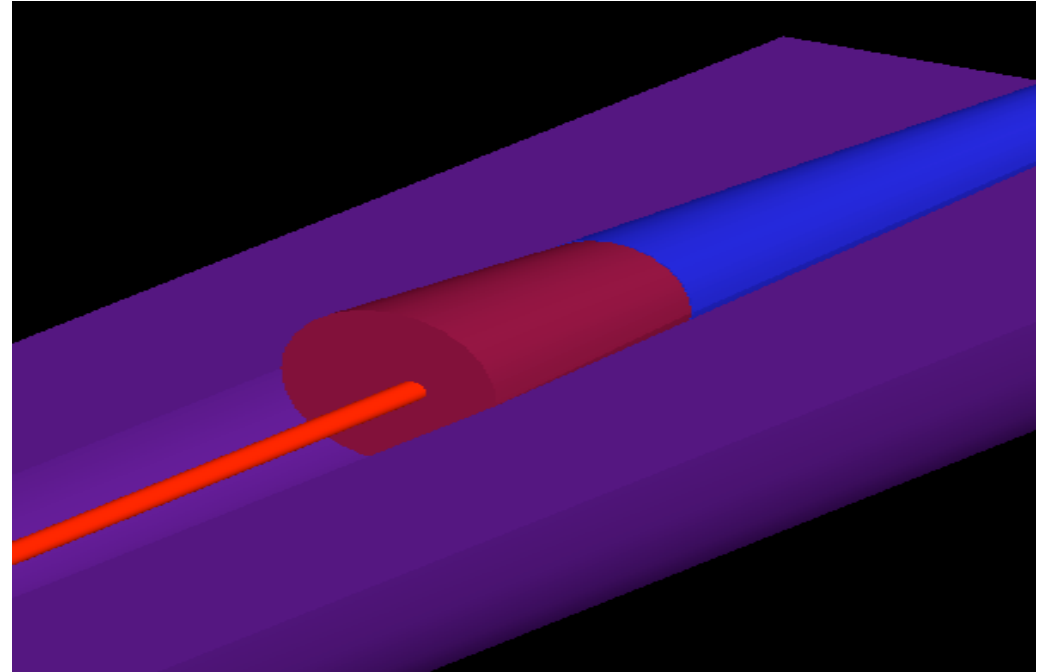
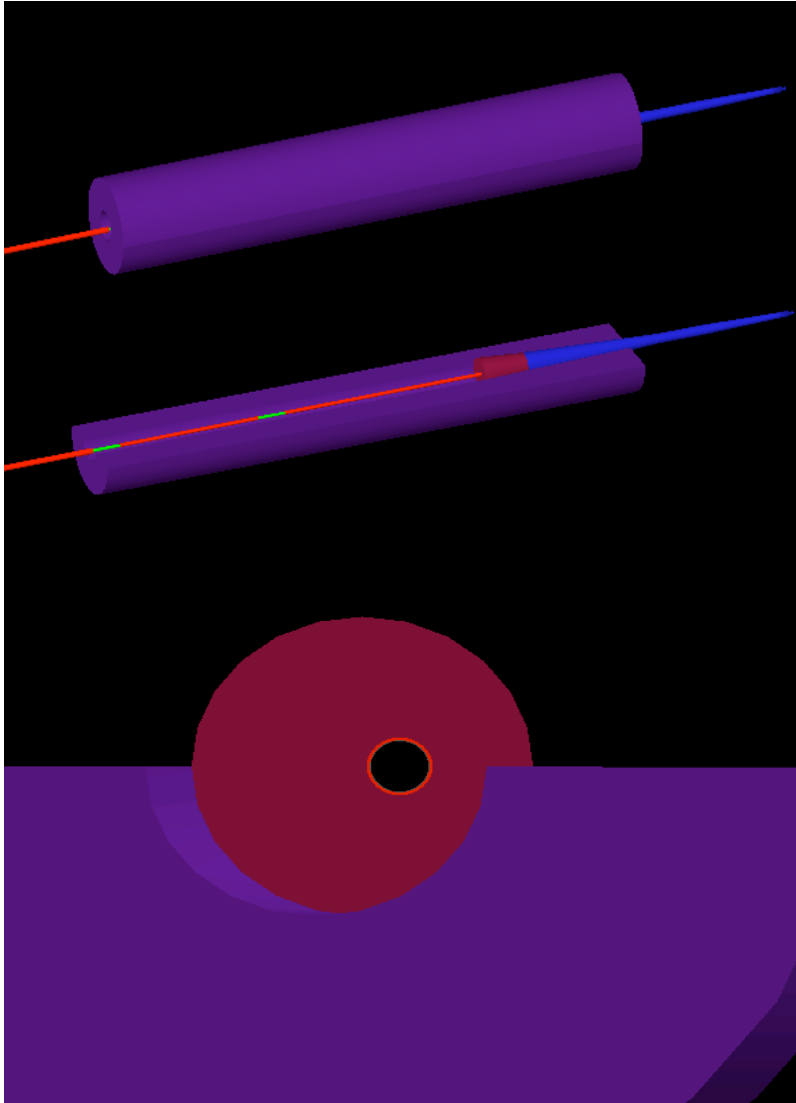
Paper on an Abacus power in the case of the 2, 14 and 20 mrad extraction line, using different beam parameters set

“SID” detector concept



- Mask @ z=3m
50cm of Tungsten (only the exit hole)
- Only the extraction line simulated (50m out of 300m)

“SiD” in BDSIM simulation (Mokka description)



This is a very simplify SiD detector description with pure B_z field
Need to simulate in BDSIM the real detector description



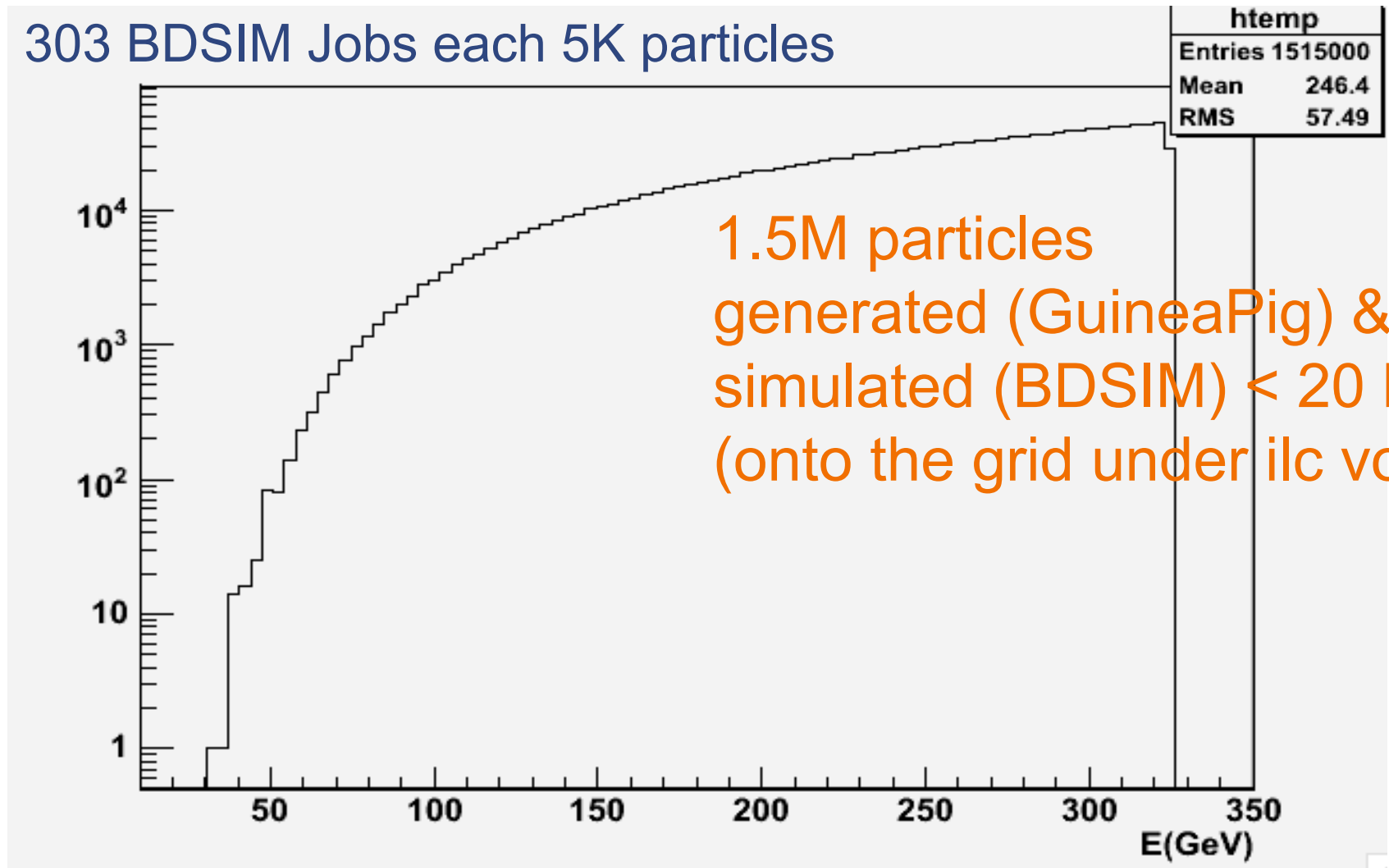
BDSIM Geant4 flags



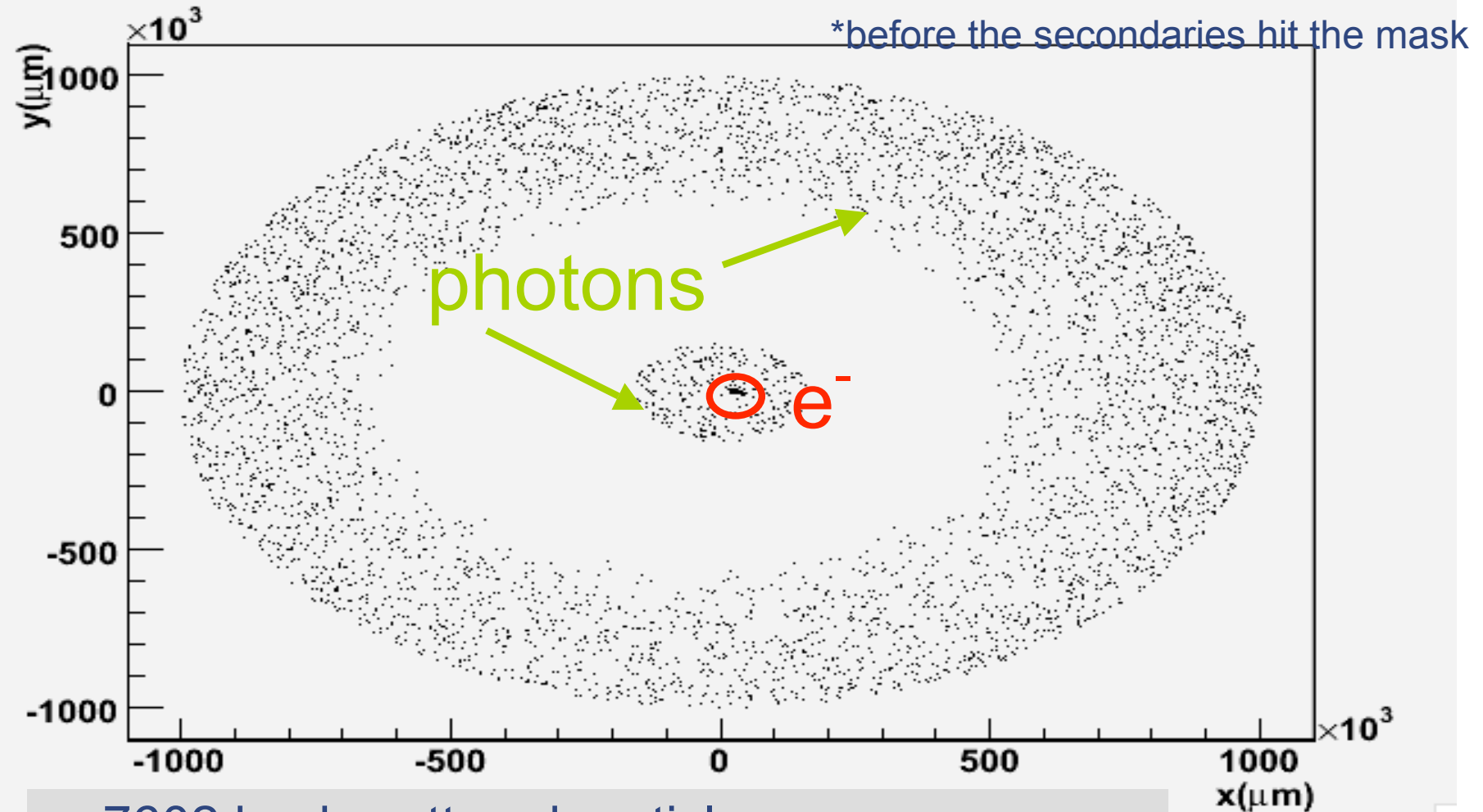
- beampipeRadius = 10 * cm,
- beampipeThickness = 0.1 * cm,
- tunnelRadius= 2.0 * m,
- physicsList="em_standard"
 - **Ionization**
 - **Bremsstrahlung**
 - **Multiple scattering**
- thresholdCutCharged = 10 * keV,
- thresholdCutPhotons = 10 * keV;

Hadronic process not take into account

- ~140 GuineaPig Jobs (50K particles, ~25% below 325 GeV)
- 303 BDSIM Jobs each 5K particles

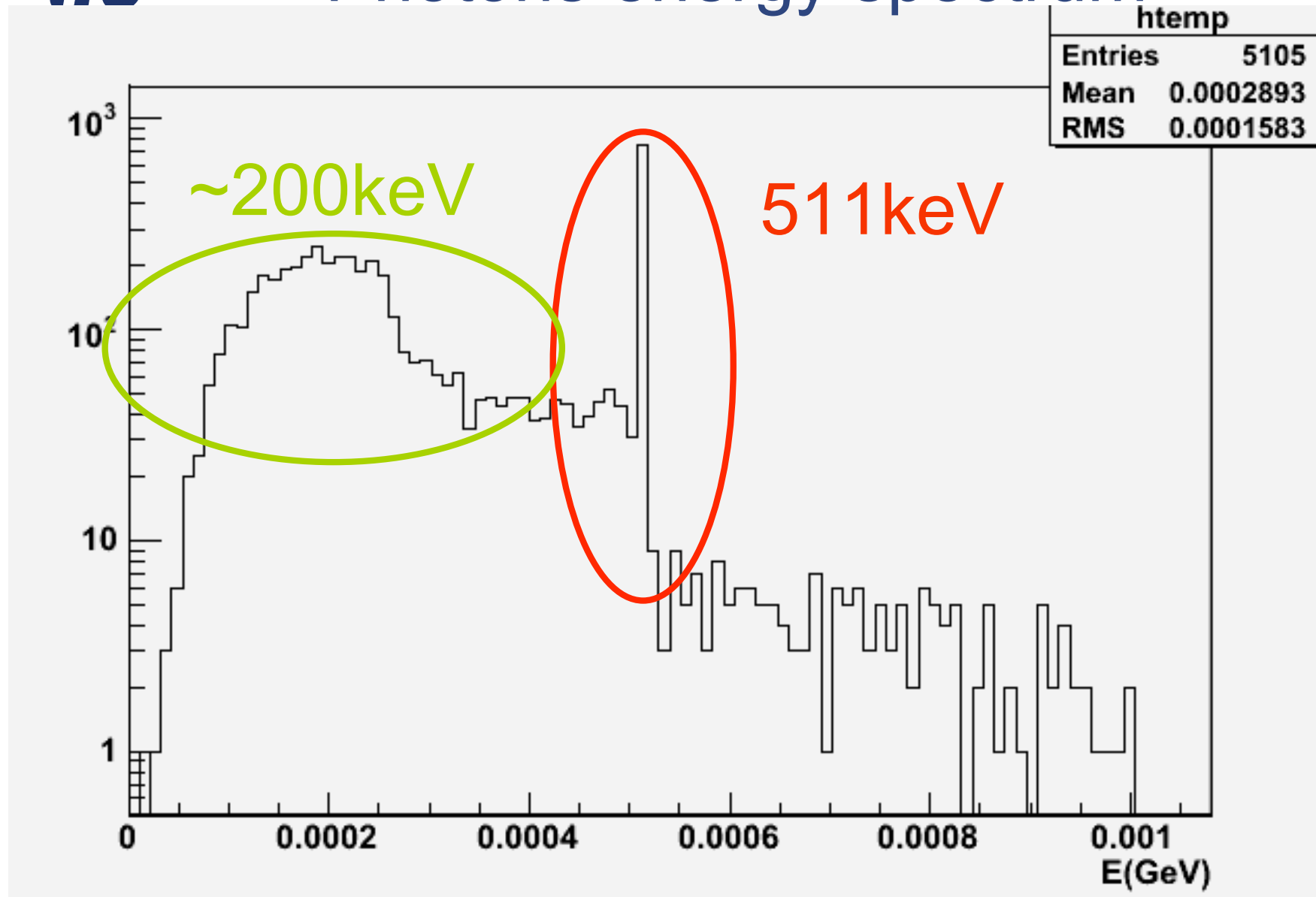


Backscattered particles @ 3.5m before* the mask



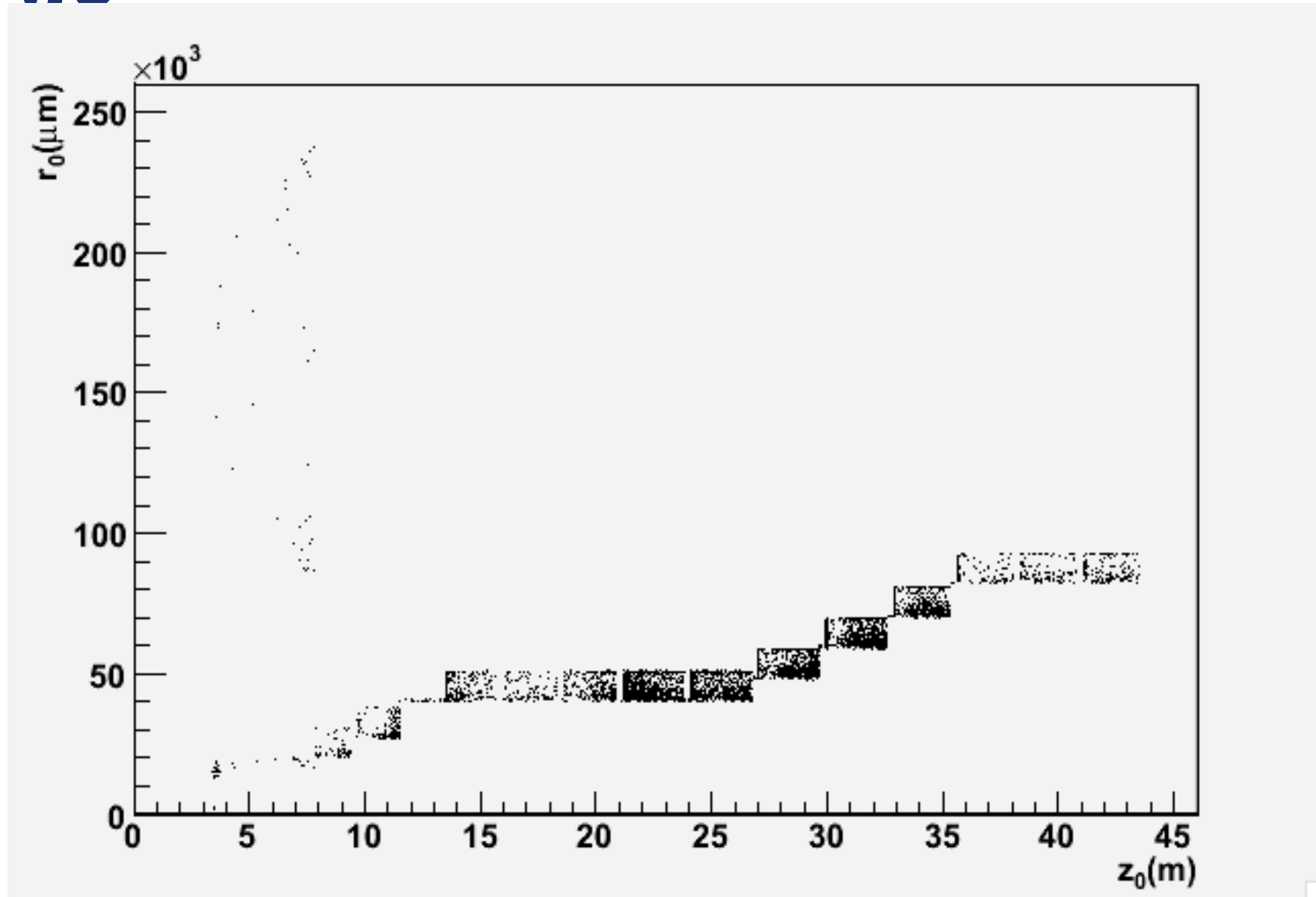
- 7602 backscattered particles:
 - 5267 photons, 2311 e^- & 24 e^+

Photons energy spectrum



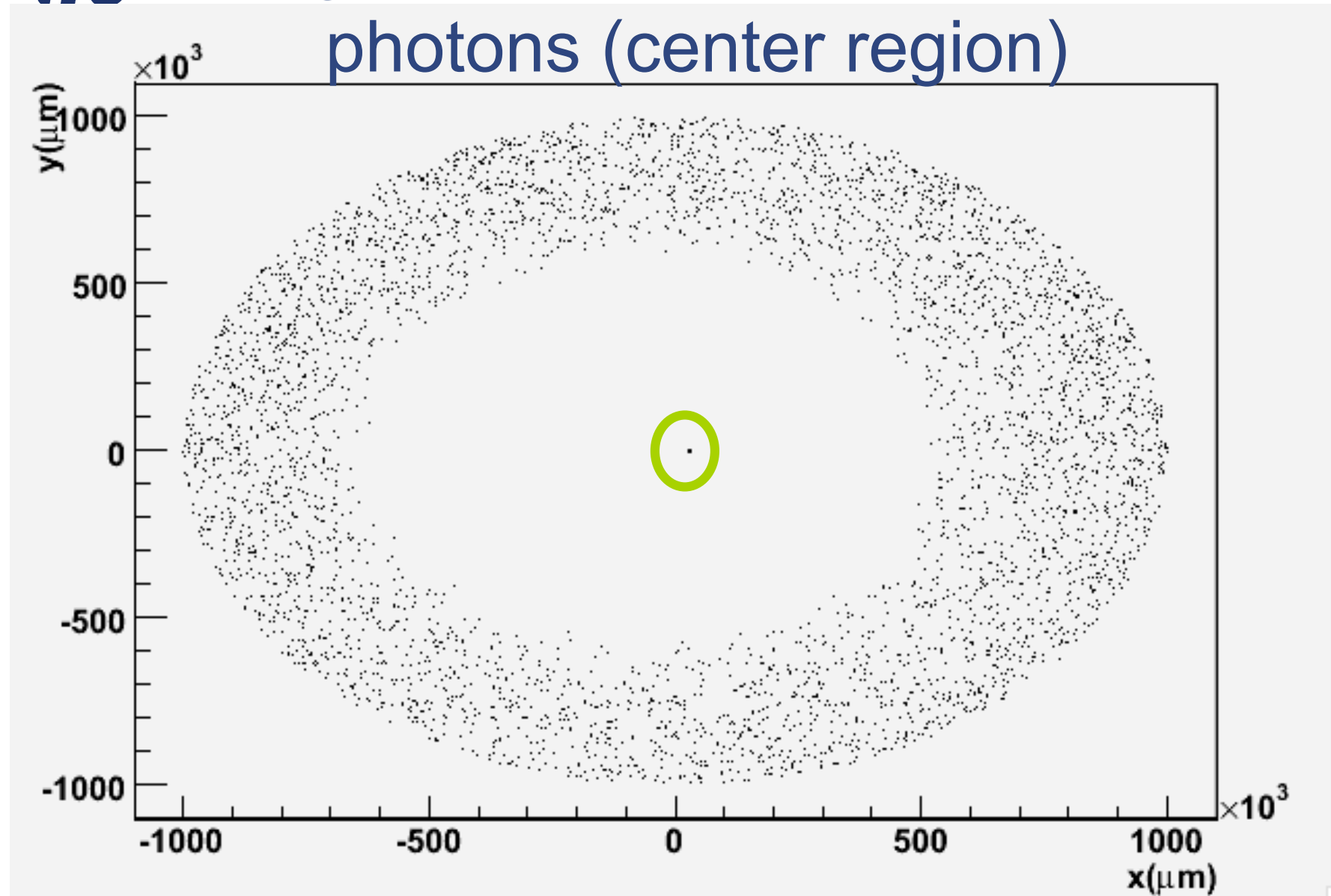


Where those photons were created ?

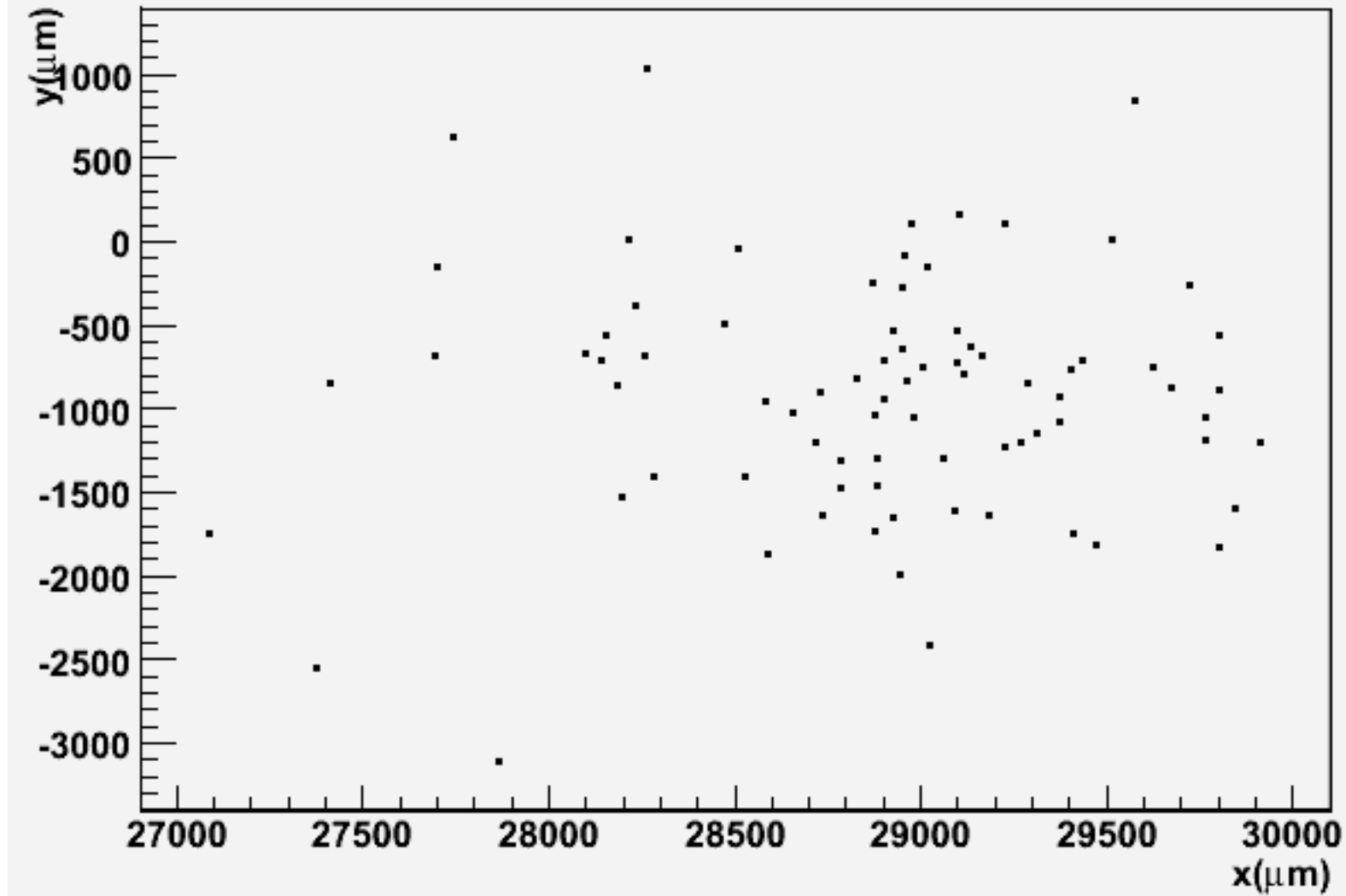




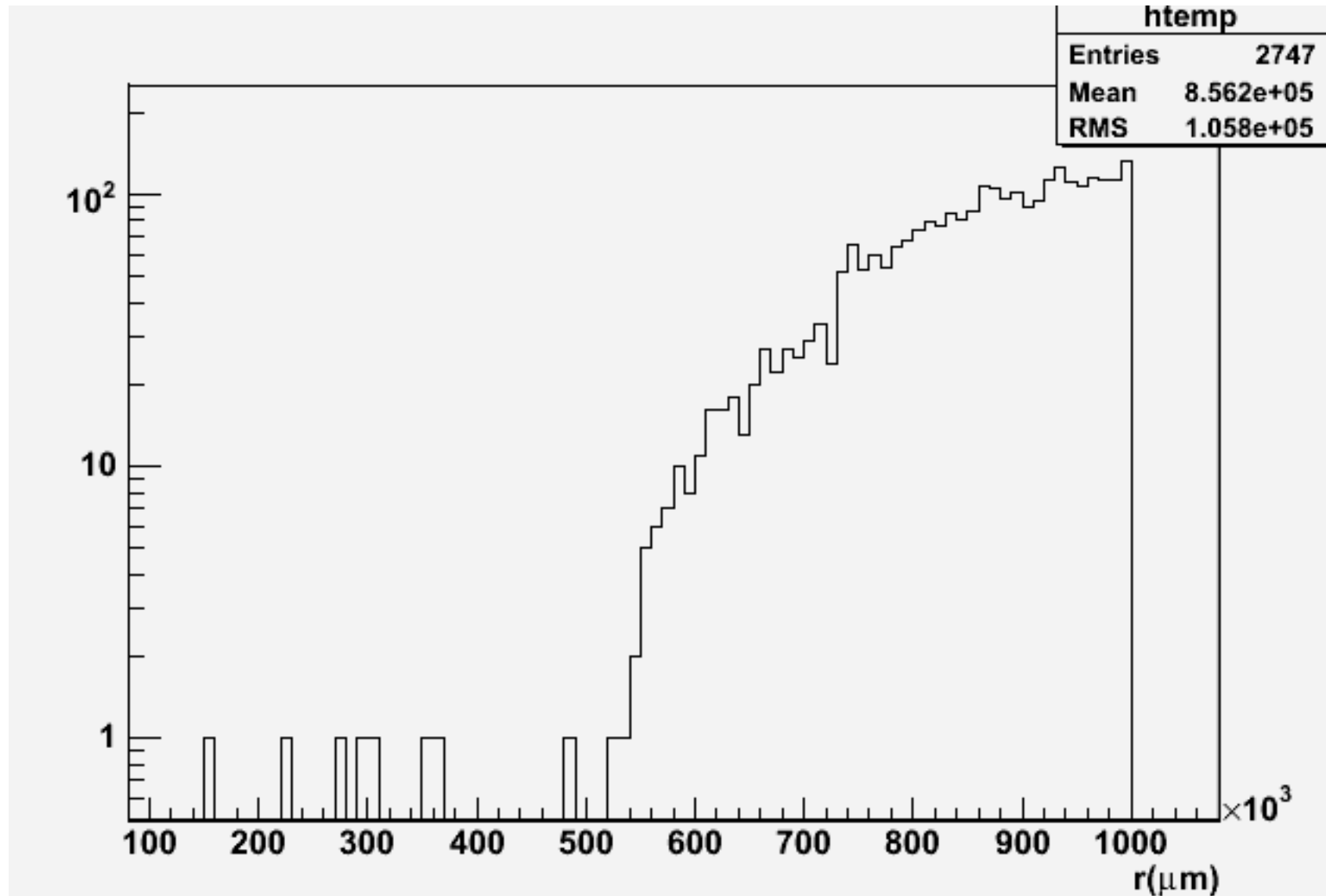
Tungsten mask stop most of the photons (center region)



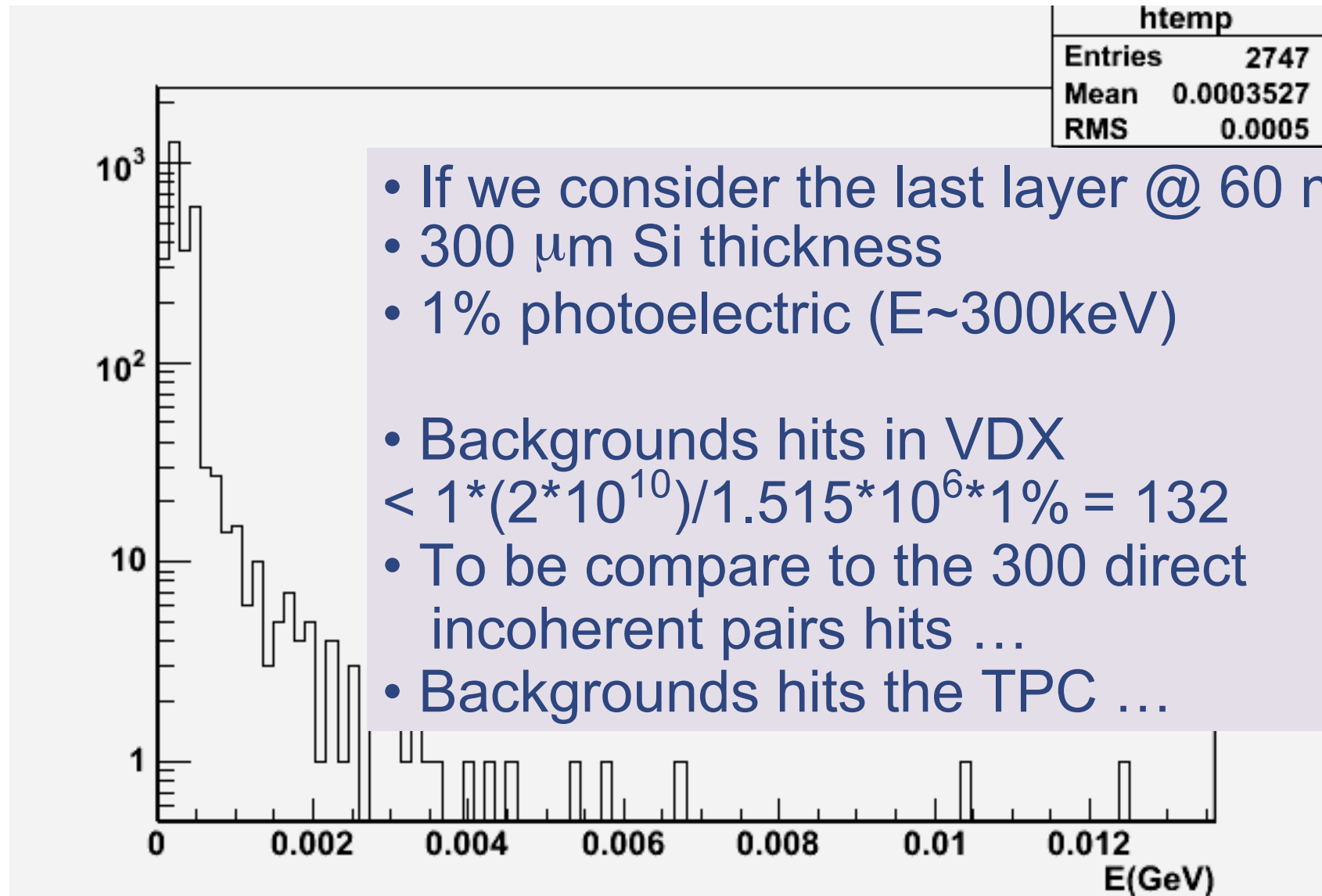
... but some of them passed through the hole of the mask ...



...and can reach the VXD ...

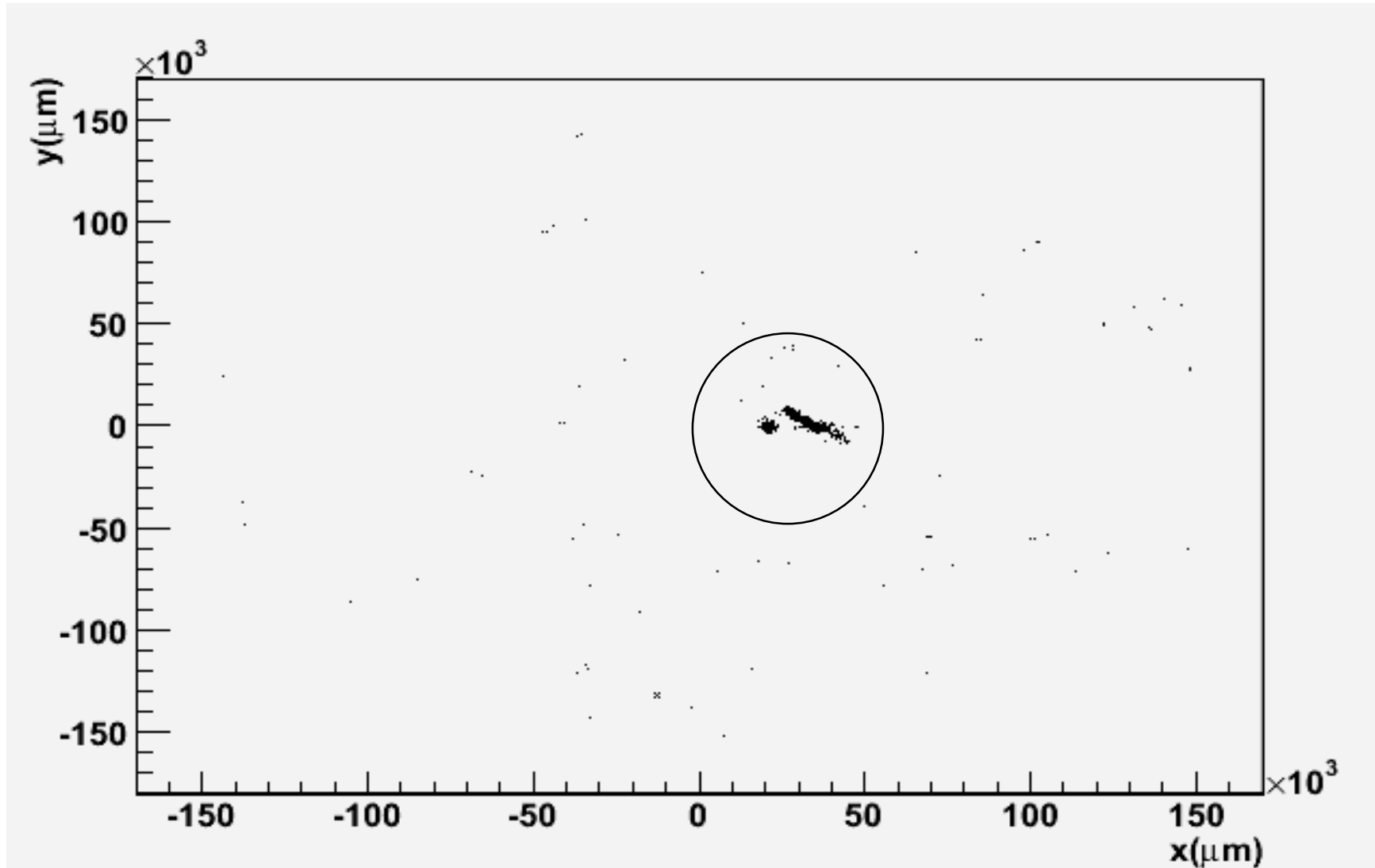


...and can reach the VXD ...



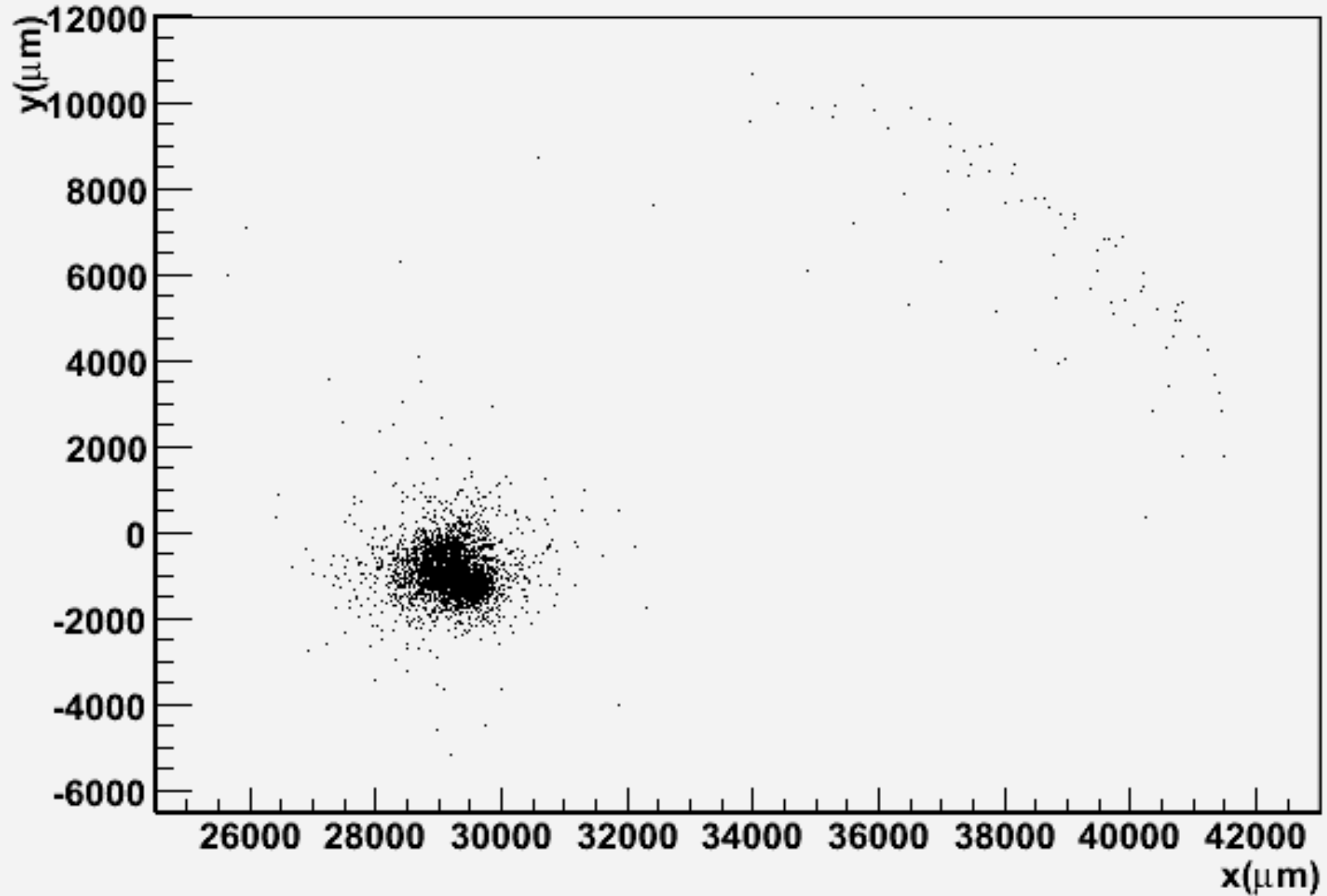


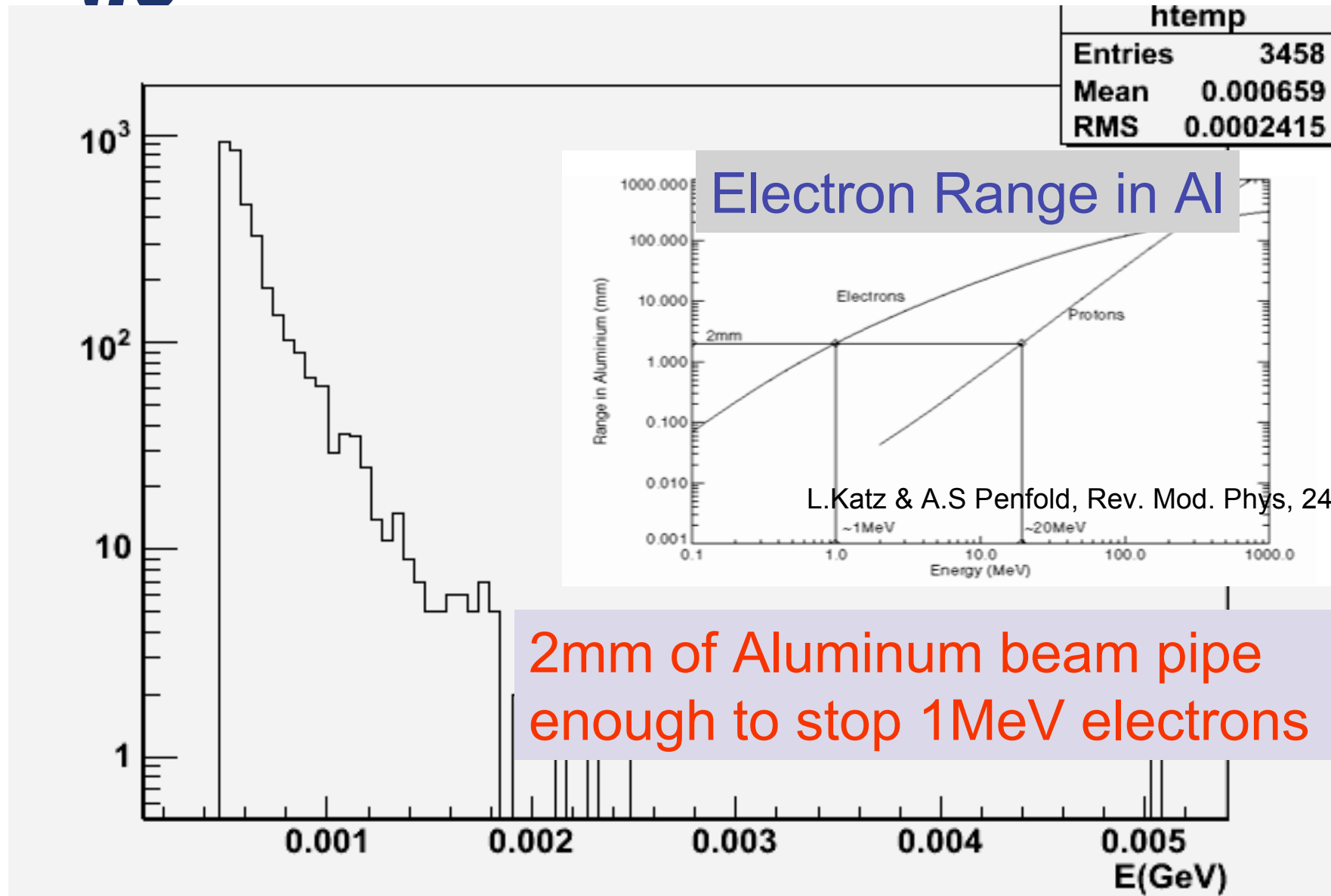
Backscattered e⁻ @ 3.5 m (y vs x)





Backscattered e⁻ @ 3 m (y vs x)







Conclusion



- Backscattered not a problem
- Backgrounds will from photons generated along the extraction line ...

Future

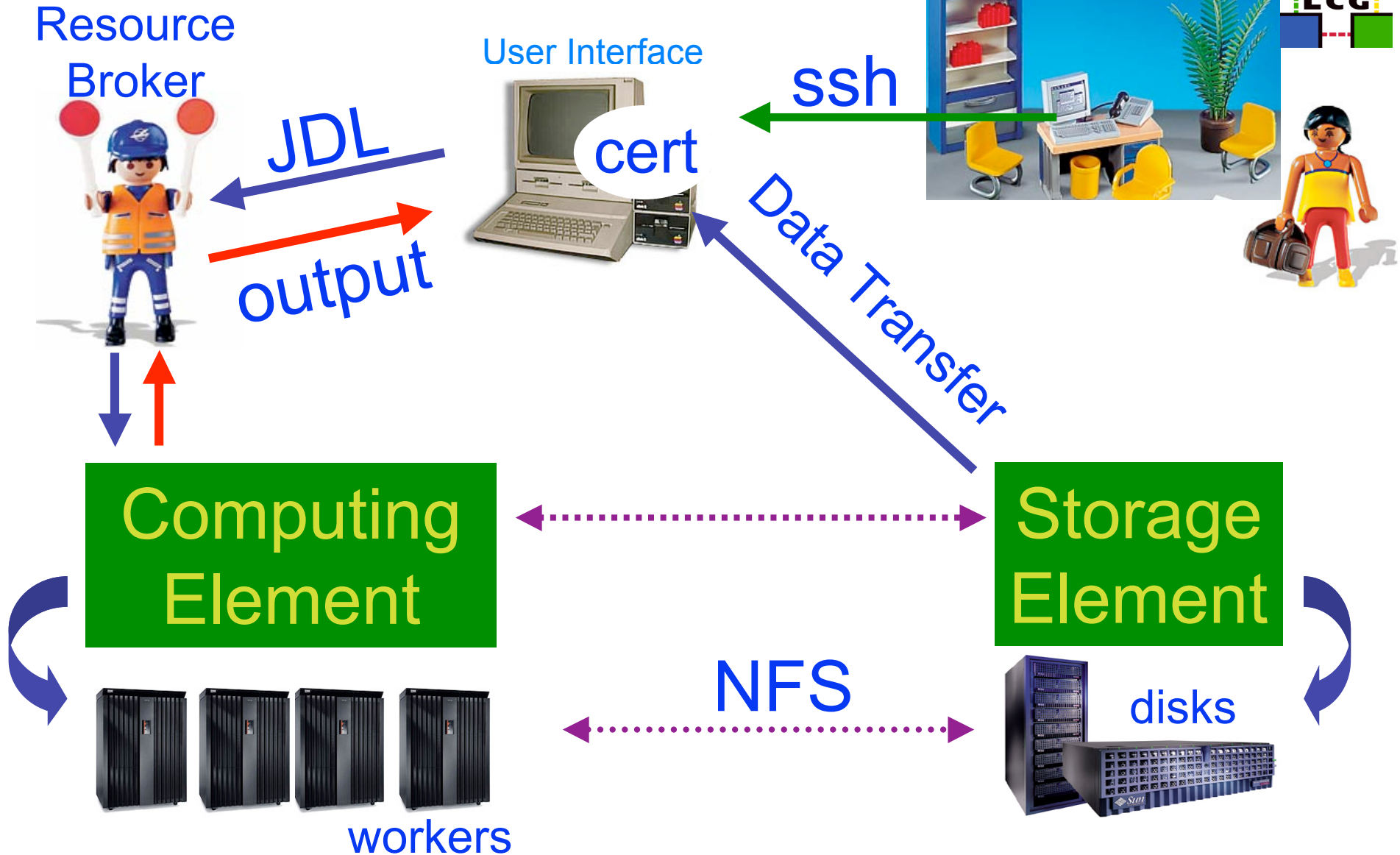
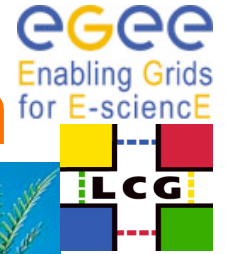
- Take the full Mokka description (Desy group)
- Take into account the losses from the radiative Bhabhas
- Put the hadronic flag on

Question

- How long the extraction line must be simulated ?
- Studies : 3(4) detectors concept X 3(4) extractions line

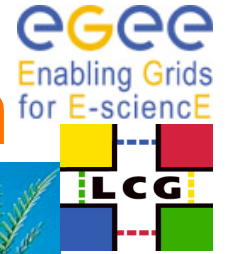


Schematics Job submission





Schematics Job submission



Resource Broker



JDL

User Interface



cert

ssh



- The VOs ILC is hosted at DESY
- ILC is currently supported by ~10 UKI sites, LAL, DESY,...

(04/04/2006 27 CEs, 3500 CPUs, 42 TB, 6 RBs)

Source Andreas Gellrich, DESY ILC Meeting, Cambridge, 04.04.2006 (<http://grid.desy.de/talks/>)

Element

Element



workers

NFS



disks



Parachute method for BDSIM

how I use Geant4 onto the grid



UI SL3 @ LAL



Tar Ball on SE Geant4, CLHEP, ROOT ...

Get the ROOT files

Computing Element

BASH SCRIPTS
n(JDLs)



RB

InputSandBox

- sh script (how to run BDSIM)
- Gmad
- GuineaPig file

- Install Lib., and the files from the JDLs on Workers
- Run the shell script
- Copy the root output on SE

GuineaPig files , also produced onto the GRID (SEED is now a argument of the program, Cécile, François et Guy) and stored on SE