mu3eSim
Fibre Simulation for the Mu3e Experiment

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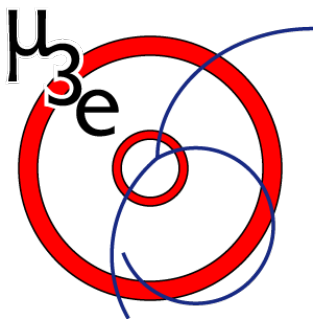
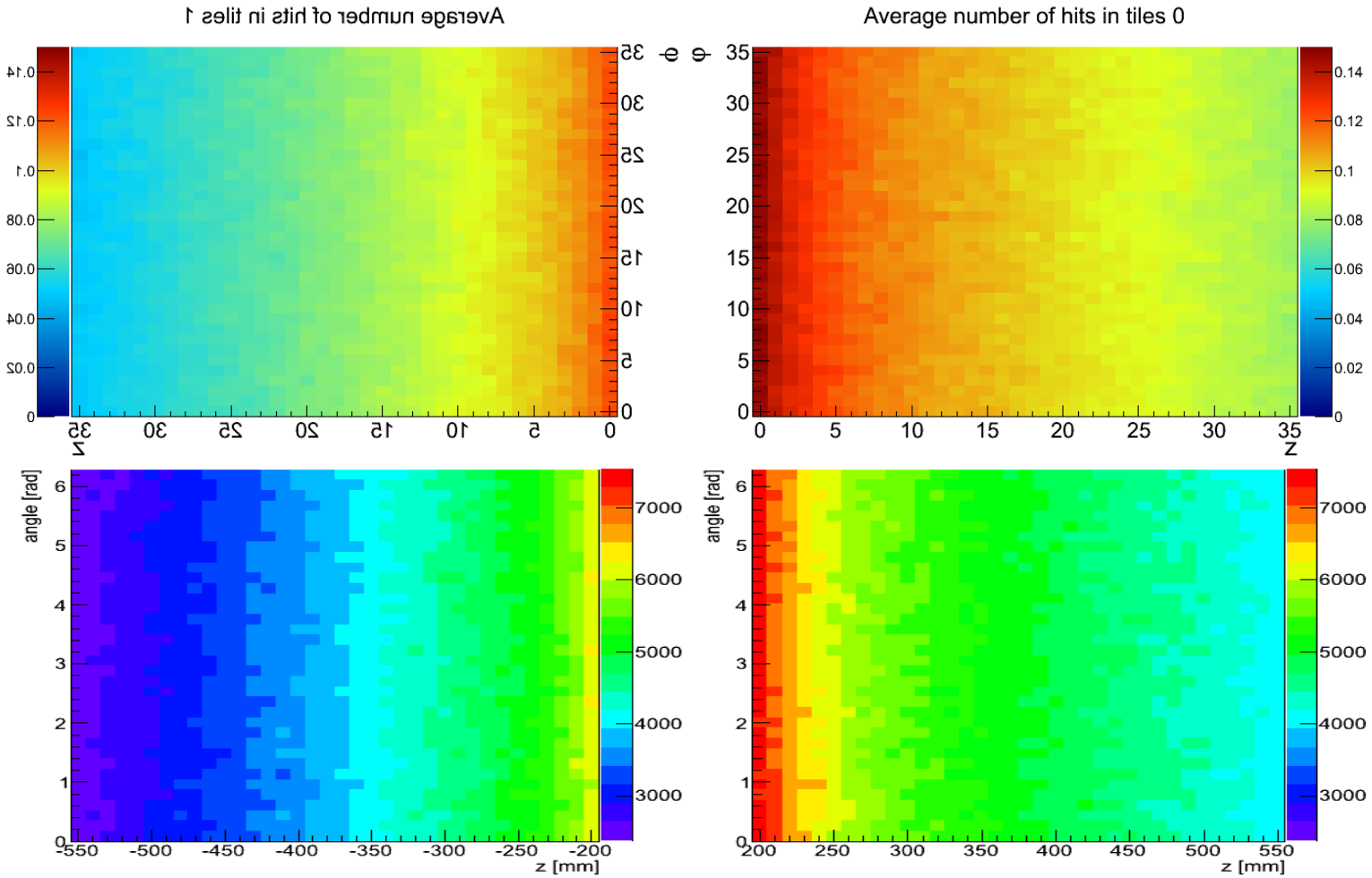


Simulation works at UZH

- simulation can now easily be installed on other computers
- several runs done at UZH
- results have been reproduced

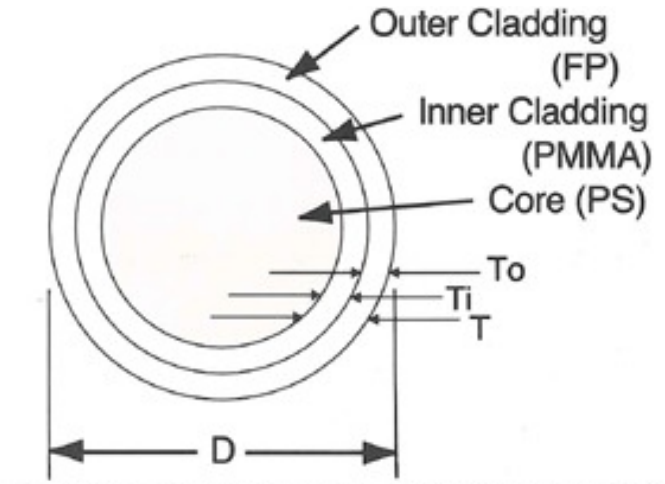


Simulation status before

- implementation of the fibres as full, structureless PVC tubes
- configuration of length and diameter possible
- the simulation stores only a hit-position and time, particle type and deposited energy

More detailed simulation ongoing now

- based on the presentation of Alessandro Bravar and on the poor documentation of Kuraray, new fibres have been implemented
- Kuraray SCSF-81M double cladding fibre
- in the simulation a fibre consists now of
  - core: Polystyrene
  - inner cladding: Polymetylmethacrylate
  - outer cladding: Fluorinated Polymer



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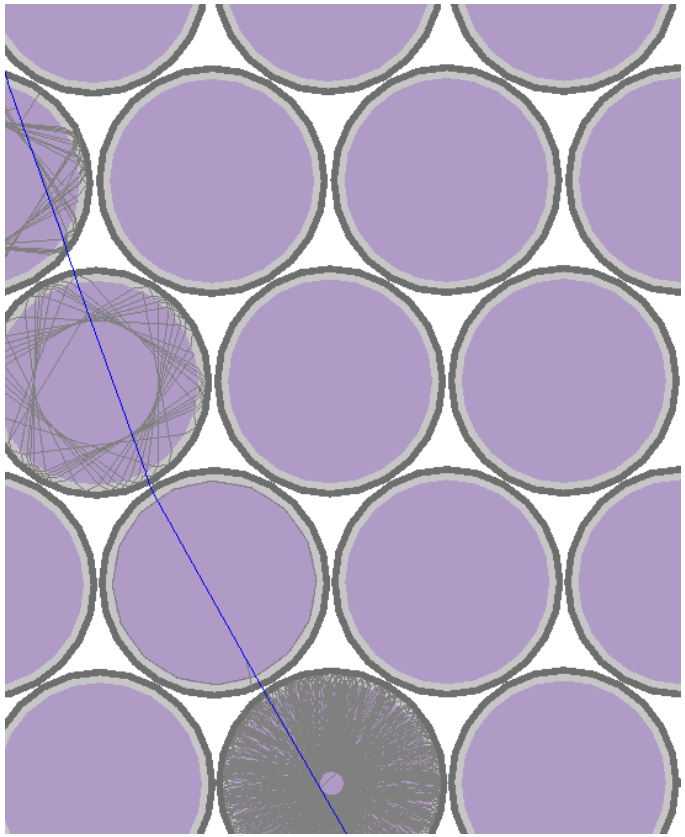
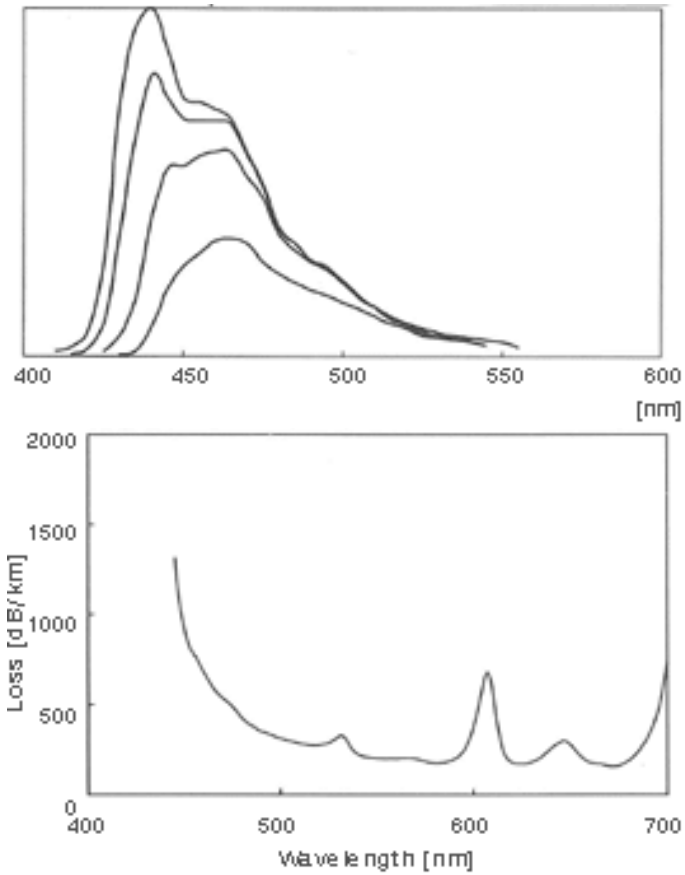


Scintillation mechanism in Geant4

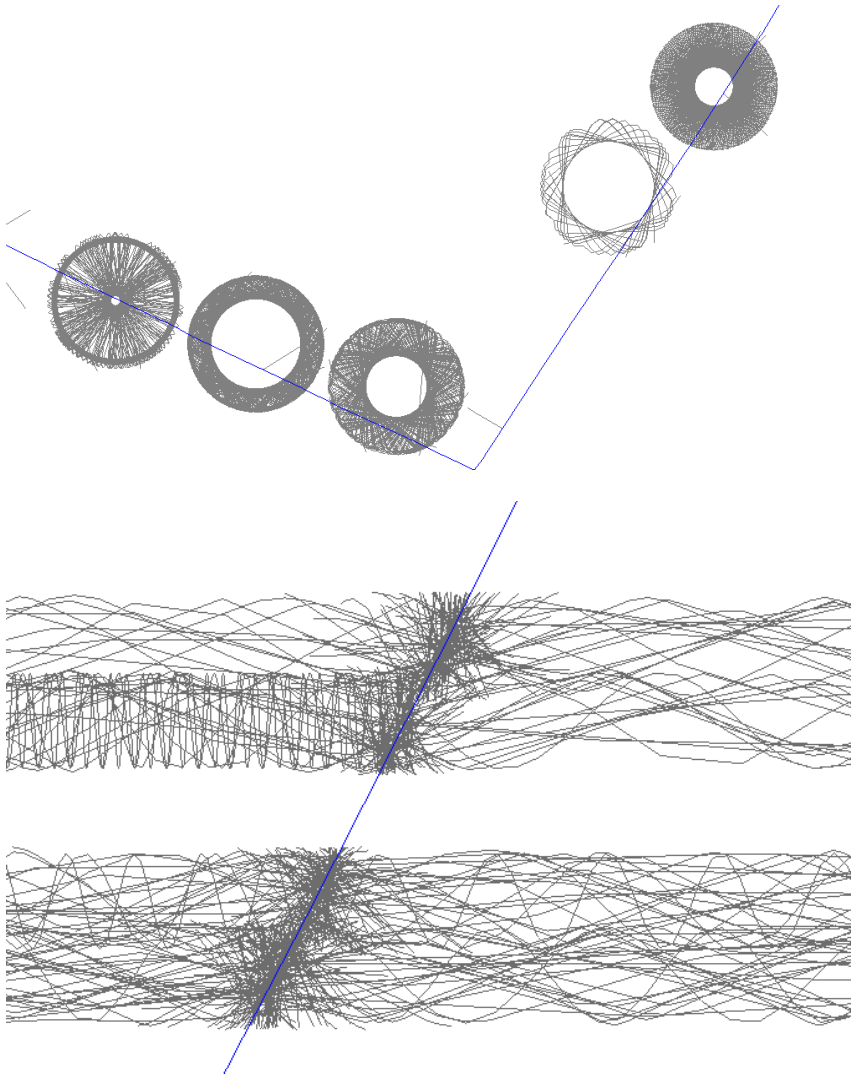
- optical photons can be generated/propagated in Geant4
- optical means $\lambda \gg$ atomic spacing
- G4OpticalPhoton $\neq$ G4Gamma
- generation of photons done with scintillation spectrum
- propagation simulation includes
  - refraction and reflection
  - absorption
  - Rayleigh scattering
  - wavelength shifting



Status quo

- material scintillation
- light yield ≈ 8 photons per keV
- propagation and absorption
- perfect surfaces assumed
- no painting
- no glue in between

$\Rightarrow$ more details needed



nice, but...

- photon propagation slows down simulation
- memory consumption high
- complete fibre simulation is only an intermediate solution
- standalone fibre simulation
  $\Rightarrow$ parametrization

open tasks:

- improvement of the fibre specifications (Alessandro Bravar?)
- crosscheck in lab
- combination with GosSiP (Patrick Eckert)