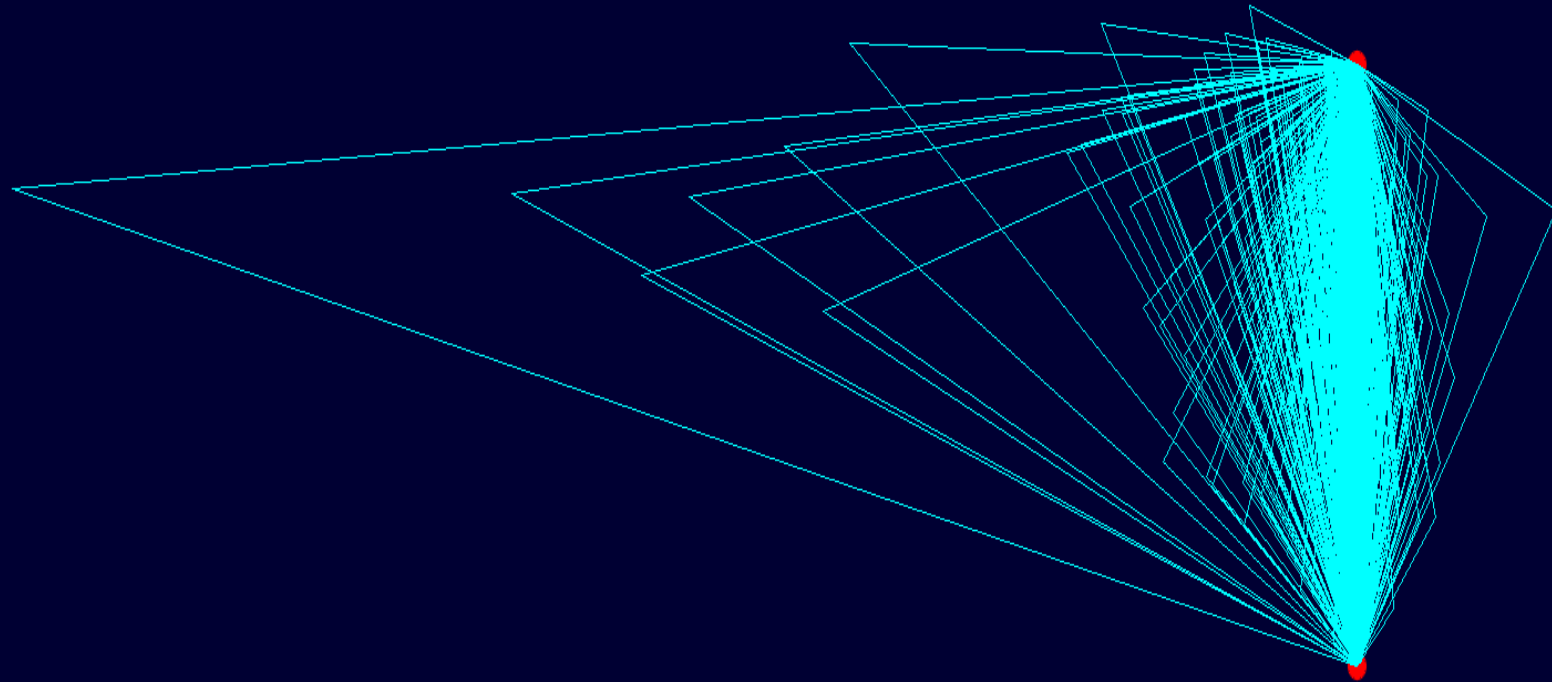


# Markov Chain Monte Carlo photon paths update



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10/5/2016

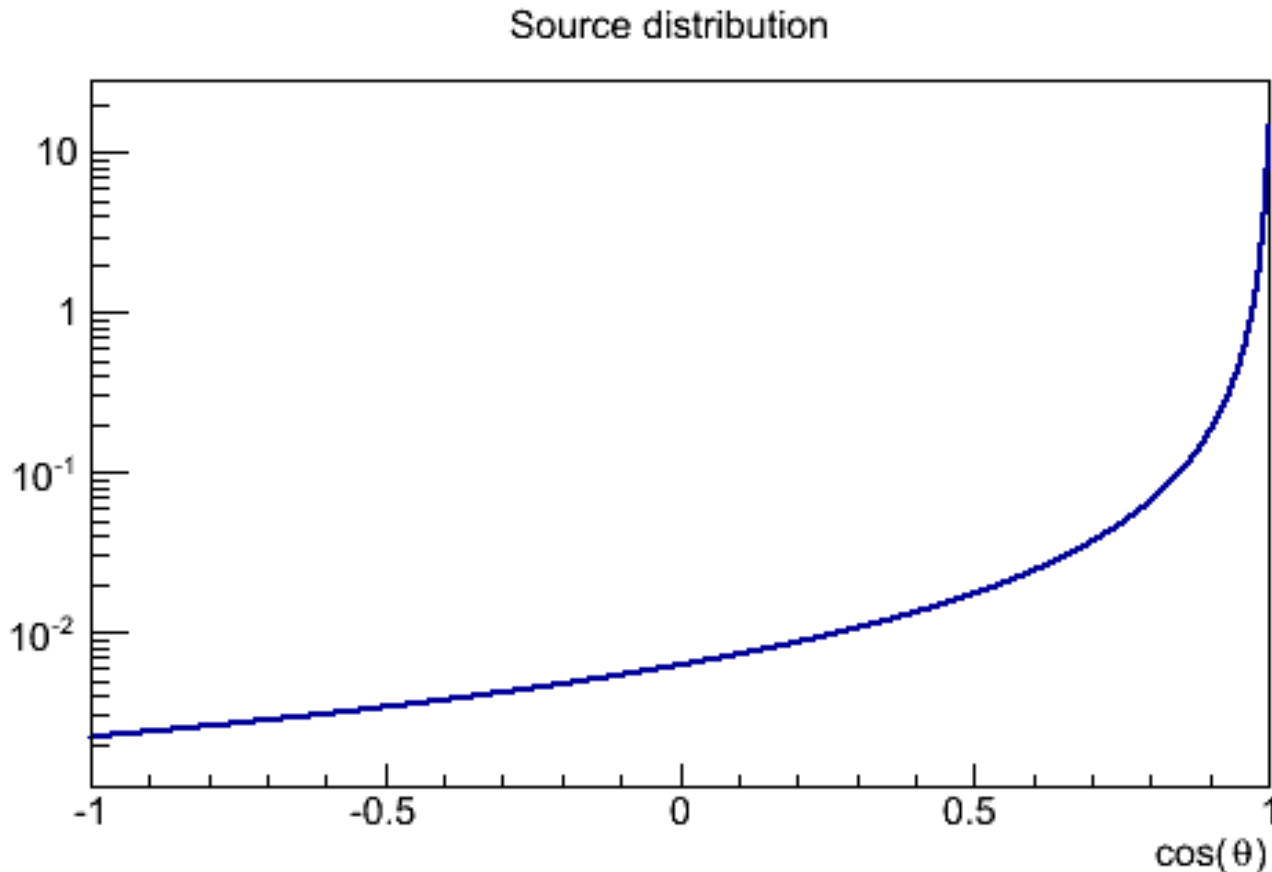
Figure: single-scattering photon paths from a directed source striking a horizontal-facing PMT

# Updates

- Migrated code to JPP “*JMARKOV*” namespace
  - Generator
  - Displayer
  - Reader
  - Integrator

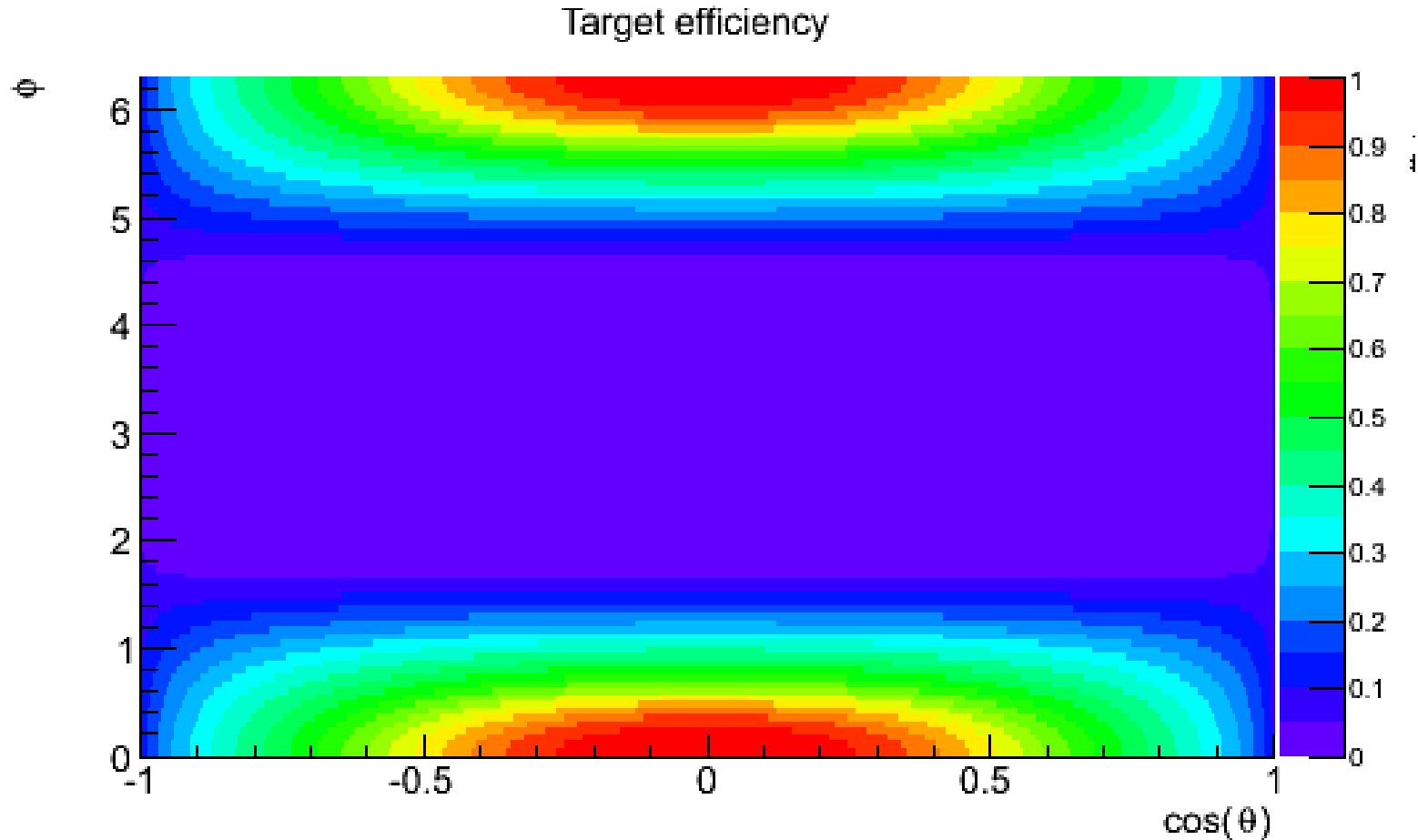
# Updates

- Light source no longer isotropic
- Henyey-Greenstein function (what else?)



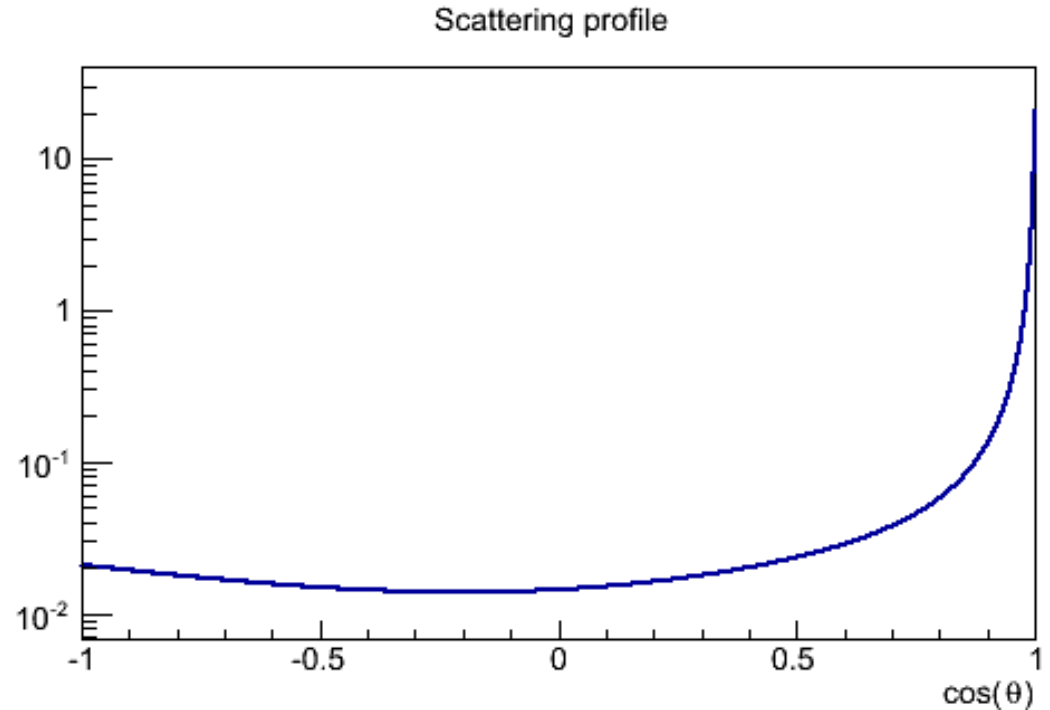
# Updates

- Added PMT angular response  
*KM3NET::getAngularResponse*



# Scattering Model

- Fully defined by
  - absorption length
  - scattering length
  - angular distribution
- Multiple mechanisms
  - e.g. Rayleigh and Mie
  - into single effective model
  - no loss of generality
- Three histograms

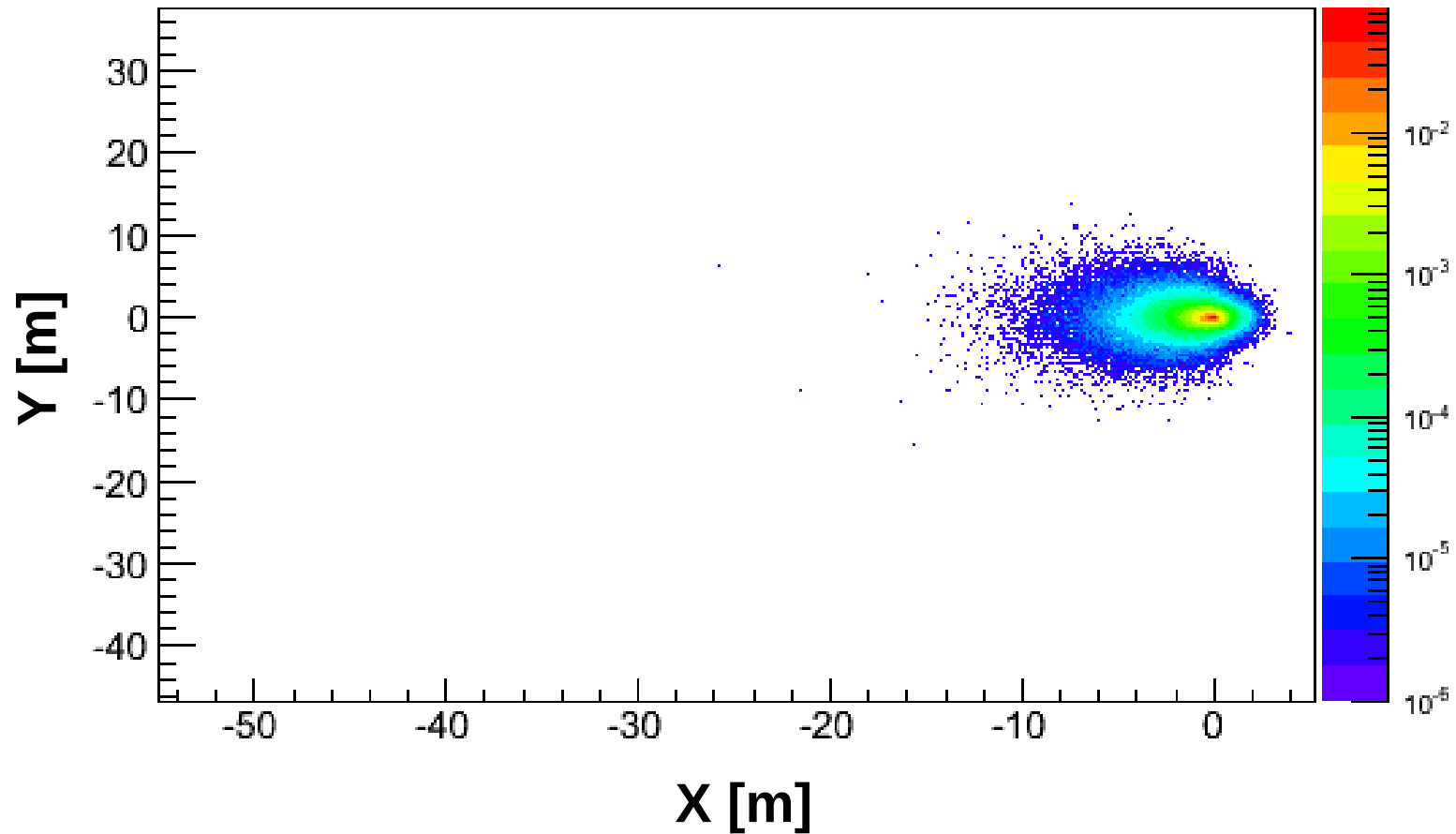


# Scattering Model

- Current reference model
  - based on *JPP examples/JApplication/JDrawLED.cc*
  - Henyey-Greenstein,  $L = 60.241$  m,  $g = 0.924$
  - Rayleigh,  $L = 294.118$  m,  $a = 0.853$
  - effective scattering length 50 m
  - absorption length 50 m

# Some first results – top view

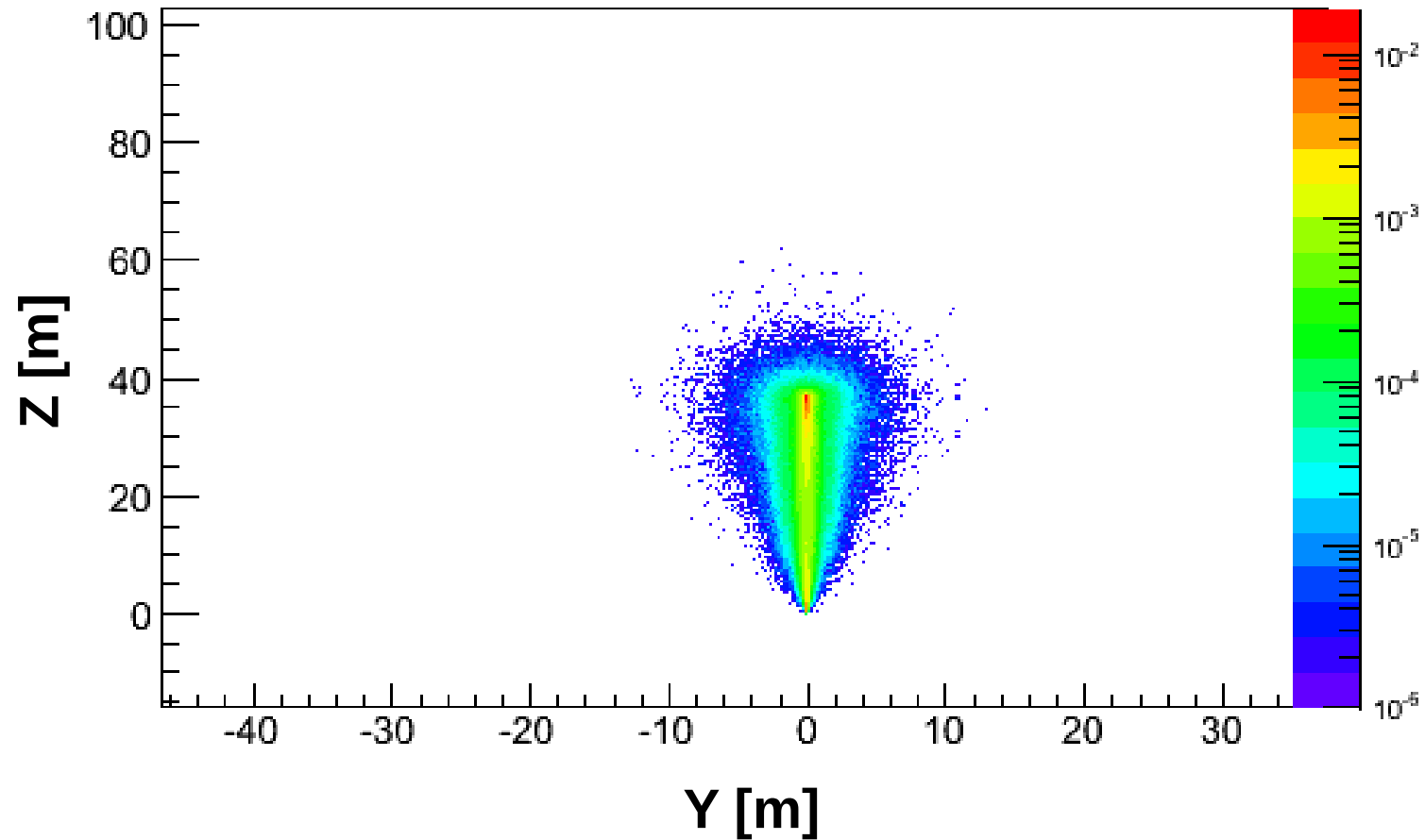
XY of vertex 1 in paths with 1 scatterings.



Single scattering with the source, scattering and target as above.

# Some first results – side view 1

YZ of vertex 1 in paths with 1 scatterings.

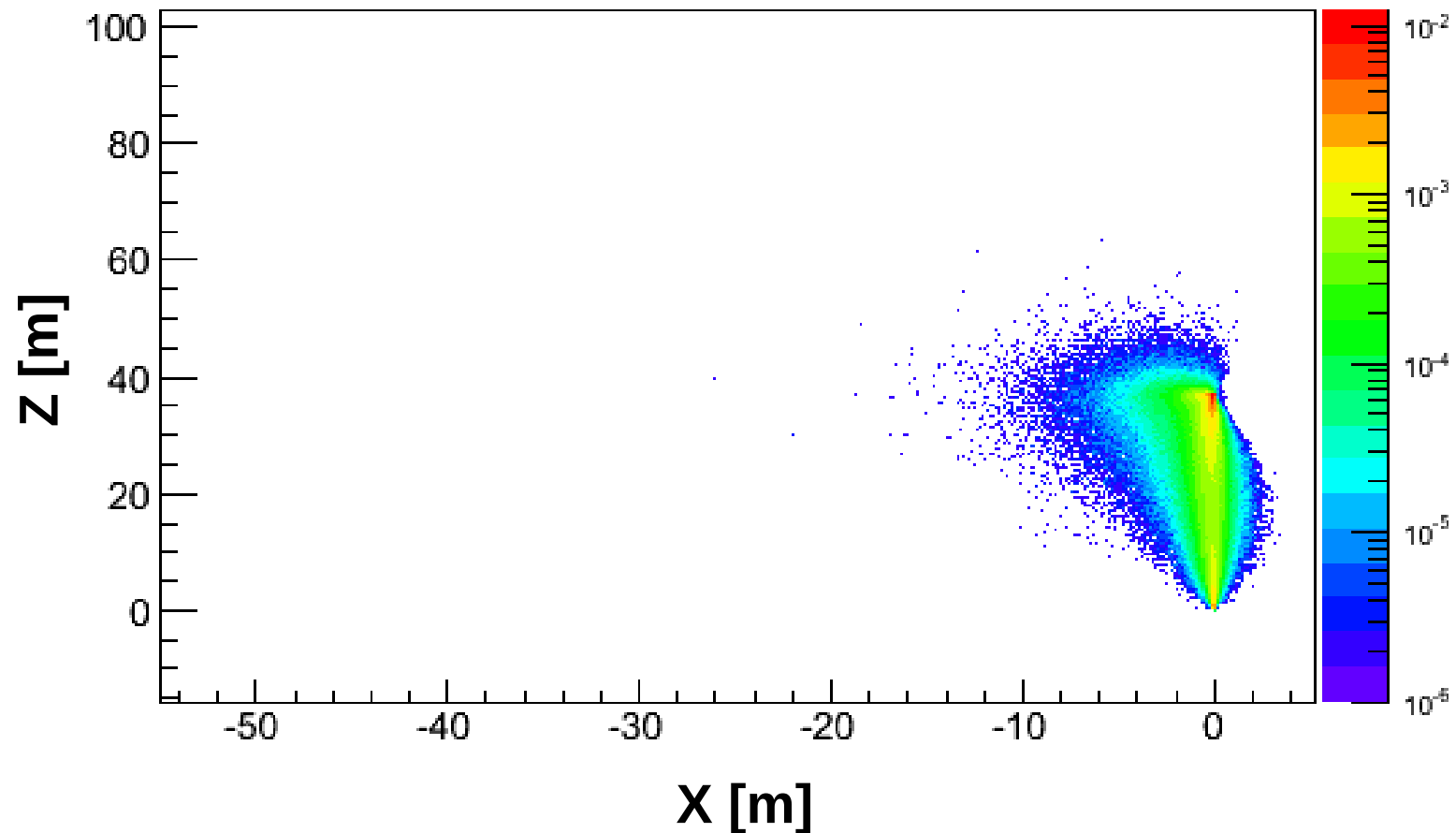


Single scattering with the source, scattering and target as above.



# Some first results – side view 2

XZ of vertex 1 in paths with 1 scatterings.



Single scattering with the source, scattering and target as above.

# Plans

- Ready to get some physics results!

# “ $t_{12} + t_{23} \neq t_{13}$ ” problem

- In nanobeacon time calibration



# Scattering and absorption

- Compare to actual nanobeacon data from the DUs
- Short + long distances
- Looking away from/towards the beacon
- Soon: between strings