THE UNIVERSITY OF WARWICK

π, μ NuFact Target Yields using Fluka

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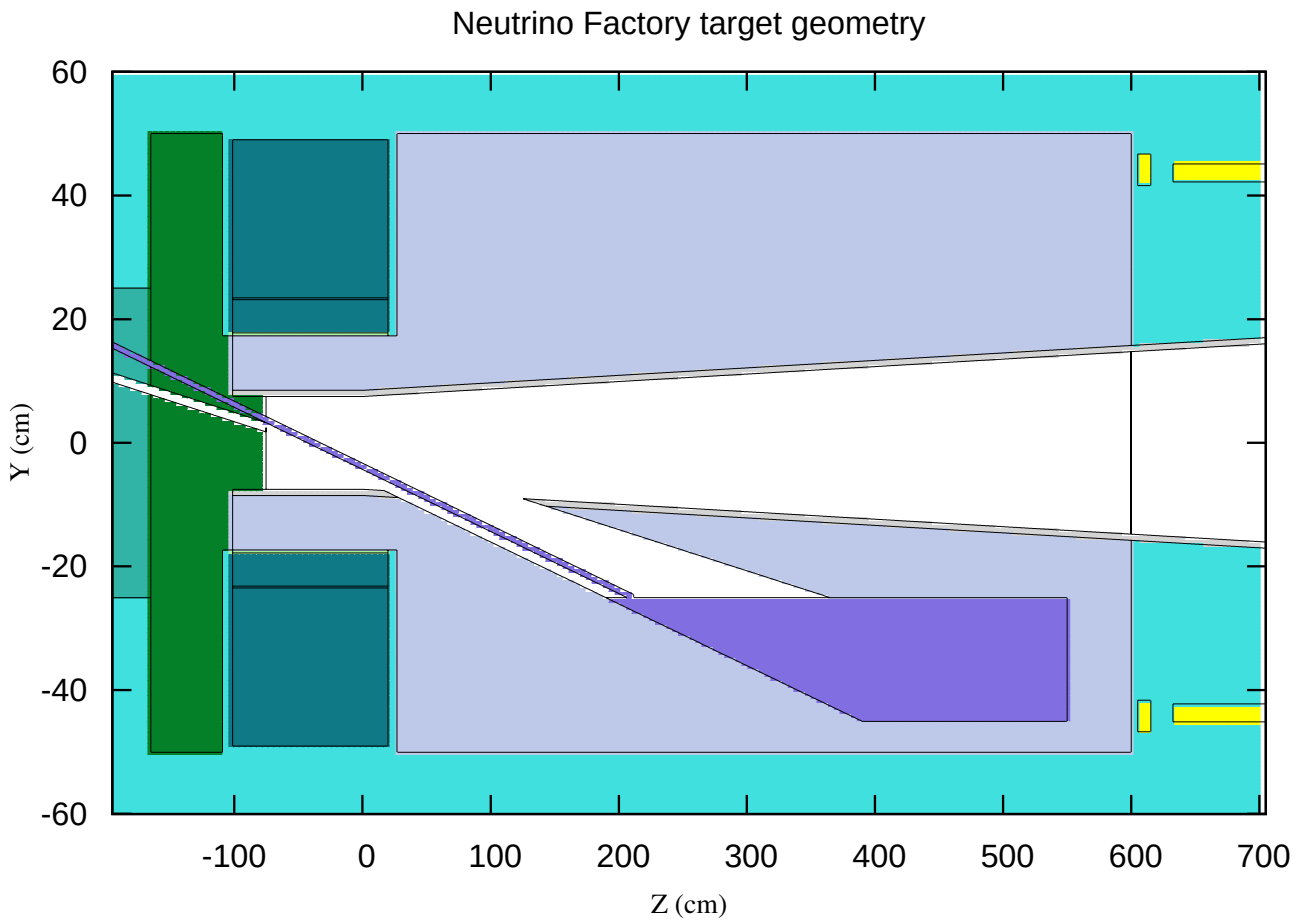
Introduction

- Using Fluka 2008.3b.1 to estimate π, μ yields for NuFact Hg jet target
- Study II geometry and magnetic field map
- Hg jet: $r = 0.5\,\mathrm{cm}$, tilt θ=100 mr
- Parabolic proton beam $r_{\mathrm{beam}} = 0.15\,\mathrm{cm}$
  - Beam tilt θ_{beam} varies with beam energy to compensate for $\underline{B}$ field bending
  - θ_{beam} is adjusted to get the beam to pass the z axis at $z = -37.5\,\mathrm{cm}$:

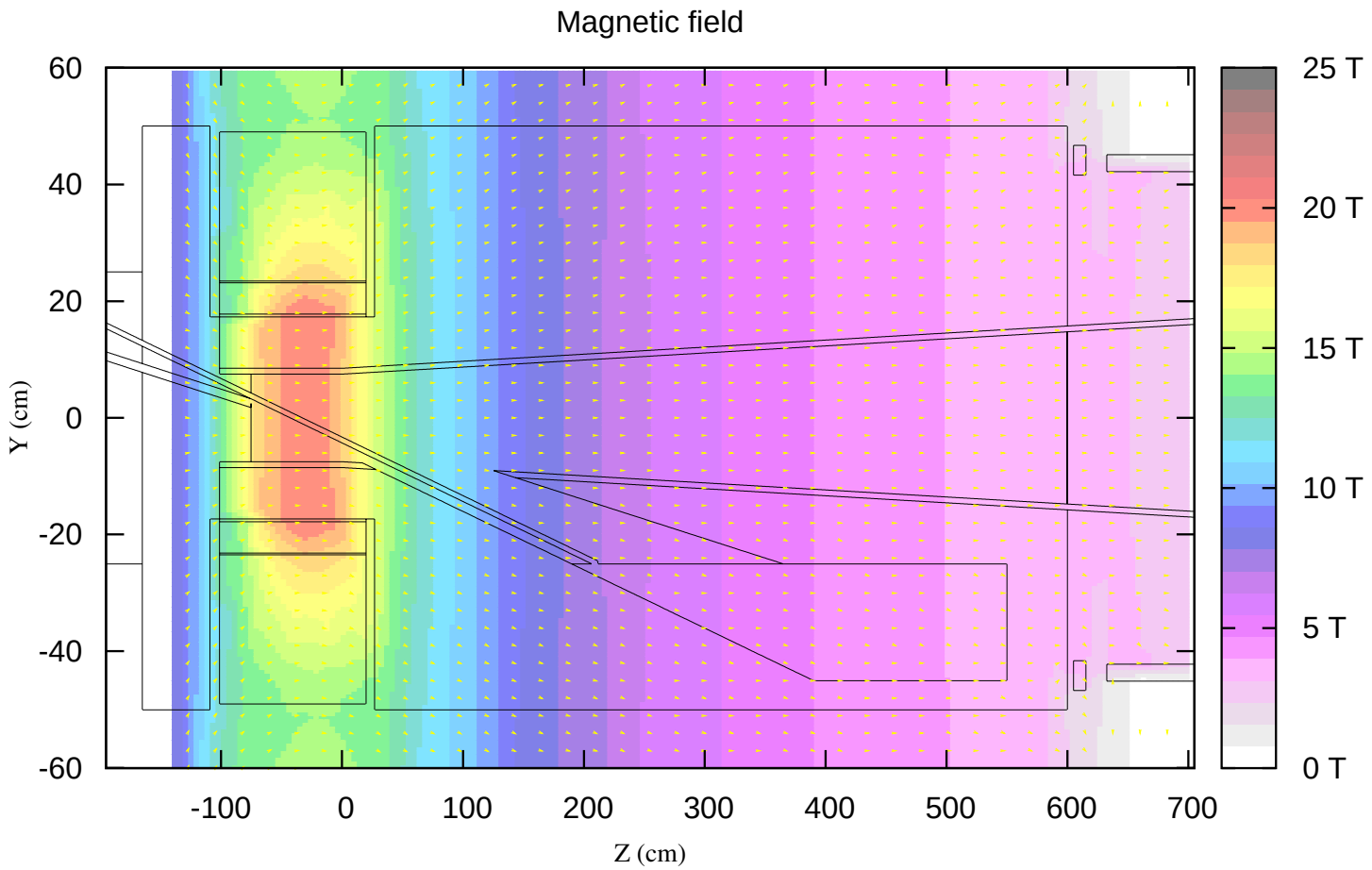
http://pubweb.bnl.gov/users/kirk/www/Target_Studies/2009_June16/Phone_Meeting_June16_2009.ppt

- Using ICOOL probability map to estimate accepted yields
- Calculating charge-averaged yields as a function of proton beam energy

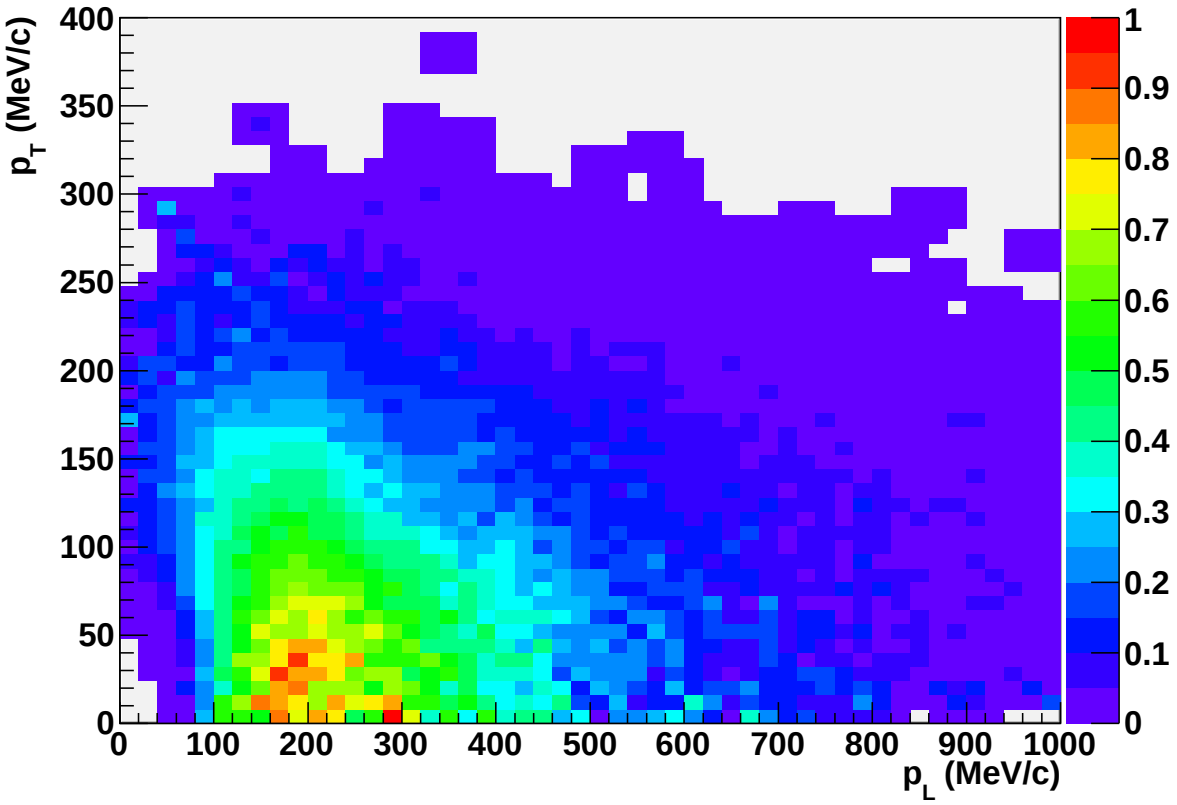
Fluka Geometry (Study II)



$\underline{\boldsymbol{B}}$ Field (Study II)



ICOOL Acceptance (Study IIa)



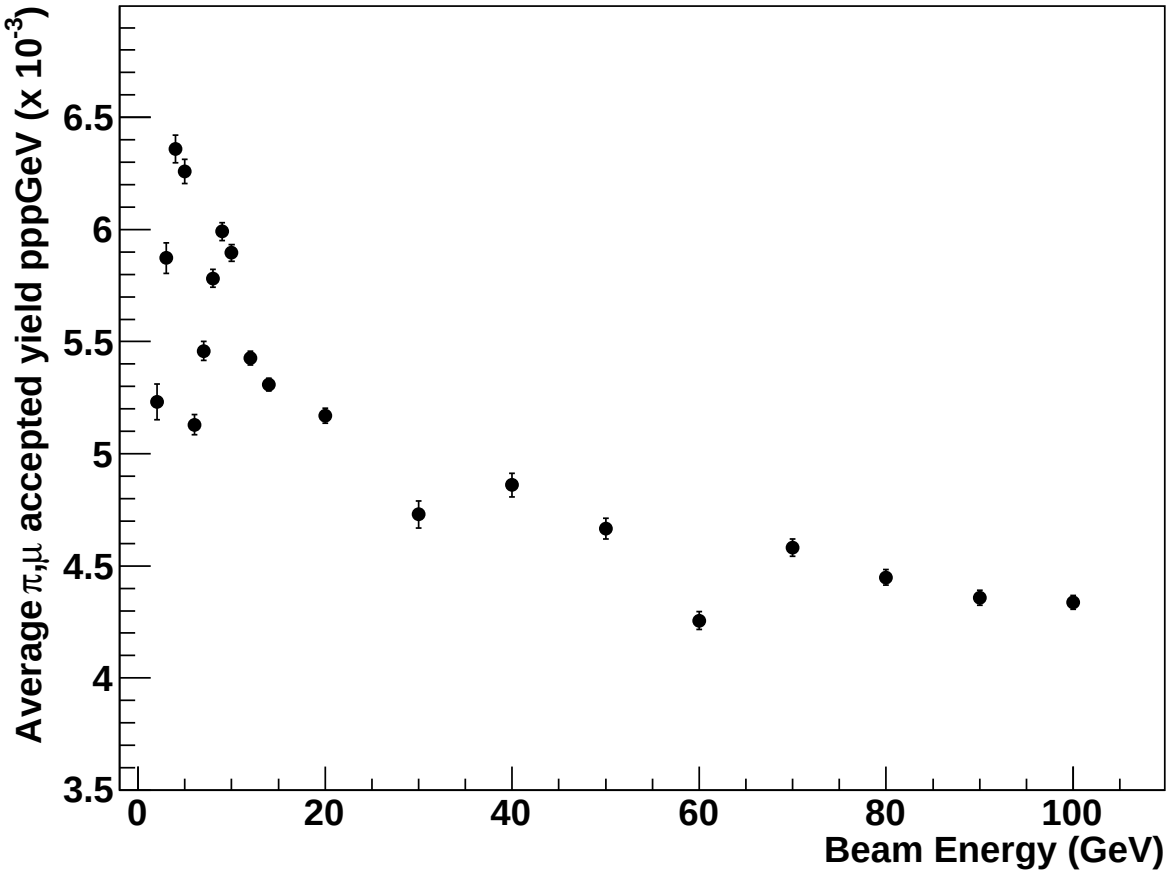
Probability map for π, μ from the target to pass through the cooling channel.

p_T and p_L are transverse and longitudinal momenta at $z = 6\,\mathrm{m}$ (Be window)

Same distribution used for earlier solid W target studies using MARS

Caveat: Study IIa ICOOL files (only ones available); but used Study II field map up to 6 m.

Fluka Accepted Yields vs Beam Energy



First peak at 4-5 GeV; second peak around 9-10 GeV.

Pre-equilibrium cascade PEANUT model for $E < 5\,\mathrm{GeV}$;

Generalised Intranuclear Cascade/Dual Parton Model for $E > 5\,\mathrm{GeV}$