Fluka and Mars Energy Deposition Comparison

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20th April 2010
Introduction

- Mars and Fluka energy deposition studies for NuFact target:
  - Similar energy deposition \( E_{\text{dep}} \) in the Hg jet target and shielding
  - However, Fluka gives higher \( E_{\text{dep}} \) values in the SC coils
- Short study to investigate differences between the two codes:
  - Proton beam: parabolic beam \( r = 0.5 \) or \( 1 \) cm, \( E = 10 \) GeV
  - Simple tungsten target, no \( B \) field, nor complicated geometries
- Fluka/Mars \( E_{\text{dep}} \) ratio shows Fluka energy showers are more “penetrating”
  - Fluka \( E_{\text{dep}} \) higher as we move away from the initial proton beam
  - Explains higher \( E_{\text{dep}} \) values for SC coils in Fluka
- Following plots show normalised energy (per unit mass) deposition & the Fluka/Mars ratio for a few simple case studies
Study Case I

Fluka

Mars

Fluka/Mars

p beam
r = 0.5 cm
E = 10 GeV

W cylinder

r (cm)

z (cm)
Study Case III

Fluka

Mars

Fluka/Mars

W cylinder

p beam

$E = 10$ GeV

$r = 0.5$ cm

$z$ (cm)

$r$ (cm)
Study Case IV

Fluka

Mars

Fluka/Mars

W slabs separated by vacuum spaces