Energy Loss Model

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Energy loss step by step

Incoming beam energy loss
due to ionization, external Bremesstrahlung

Internal Bremesstrahlung

Electron scattering

Internal Bremesstrahlung

Outgoing beam energy loss
due to ionization, external Bremesstrahlung
Last time Review

Ionization Model comparison

- Look at the energy loss distribution for electron pass through carbon at fixed length 1.016cm
- Only ionization model
- Blue is from fluctuation model
- Red is from New Landau function $\text{Landau}(x, \varepsilon)$

Fixed pass distance **1.016cm** for each event

Only carbon layer, not g2p target

Consistent!
Last time Review

Model vs Data

- Blue: from data, C w/o He optics
- Red: is from simulation: ioni fluctuation + internal+external brem.
- Total sieve holes

2.2 GeV, straight through Carbon without LHe run
Last time Review

Model vs Data

- Blue: from data, C w/o He optics
- Red: is from simulation: ioni fluctuation + internal+external brem.
- Center sieve holes

2.2 GeV, straight through Carbon without LHe run
• Check the two ionization models on different material
• Check data versus simulation (other targets)
Look at the energy loss distribution for electron pass through carbon at fixed length 1cm
- Only ionization model

- Blue is from fluctuation model
- Red is from New Landau function \( \text{Landau}(x, \varepsilon) \)

Fixed pass distance 1cm for each event

\( e^- \quad \text{detected } e^- \)

Only NH3 layer, not g2p target

Consistent!
Look at the energy loss distribution for electron pass through carbon at fixed length 1cm

Only ionization model

Blue is from fluctuation model

Red is from New Landau function \( \text{Landau}(x, \varepsilon) \)

Consistent!

Only LHe layer, not g2p target
Model vs Data

- Total energy loss simulation compared with data
- Blue: from data
- Red: is from simulation: ion fluctuation + internal + external brem.

Simulation width narrower

2.2 GeV, 5T carbon Run 5649
Model vs Data

- Total energy loss simulation compared with data
- Blue: from data
- Red: is from simulation: ioni fluctuation + internal+external brem.

Simulation width narrower

2.2 GeV, 5T empty Run 5650
Model vs Data

- Total energy loss simulation compared with data
- Blue: from data
- Green: energy loss due to ionization and bremsstrahlung
- Red: dp distribution due to elastic scattering
- Other cause the width larger?

2.2 GeV, 5T empty Run 5650

Simulation width smaller
Todo

• Simulation width too small?
• Any suggestions?