



Simulation of Energy Deposition in Gases

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G4 9.3.p01 (EM TestEm5)

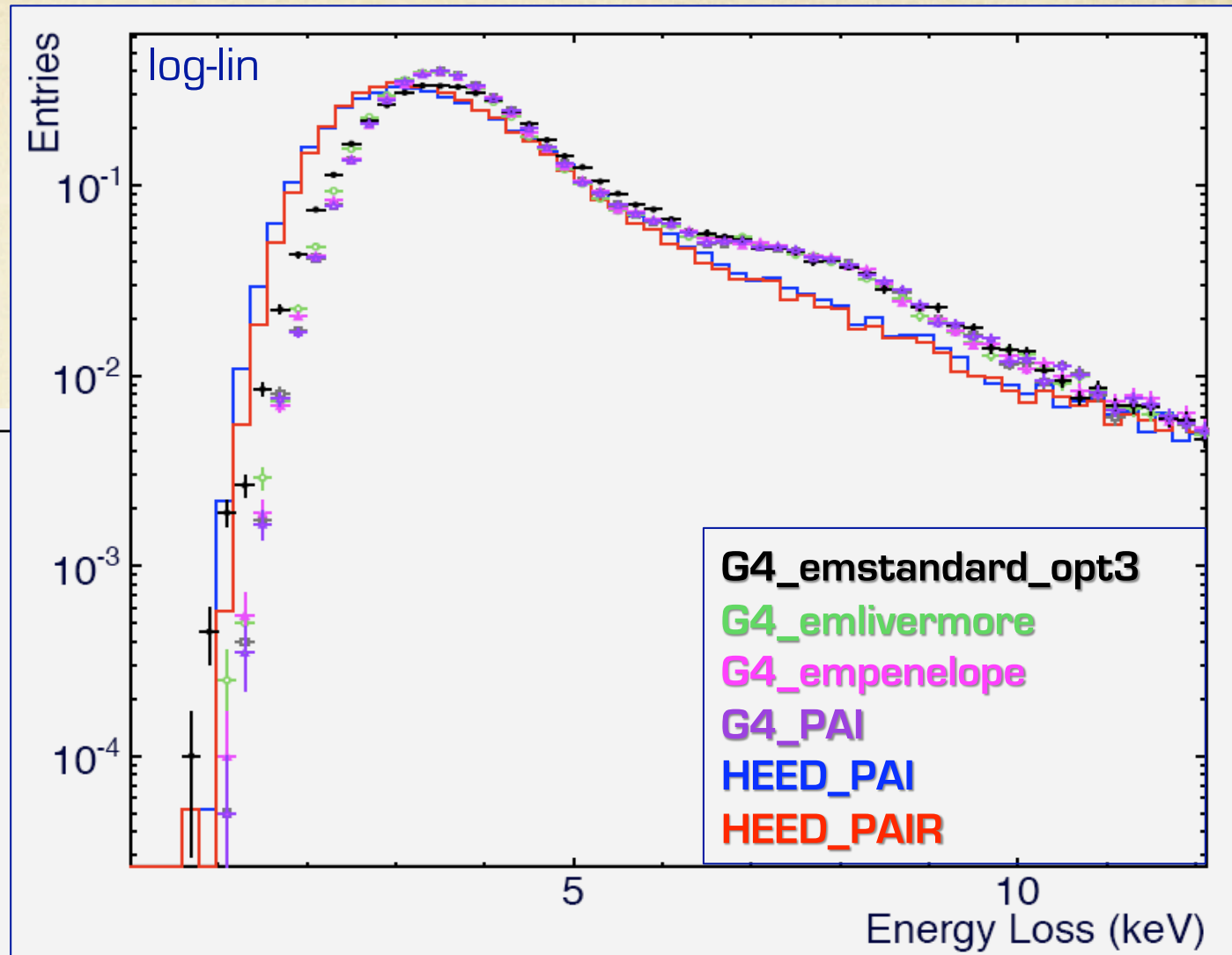
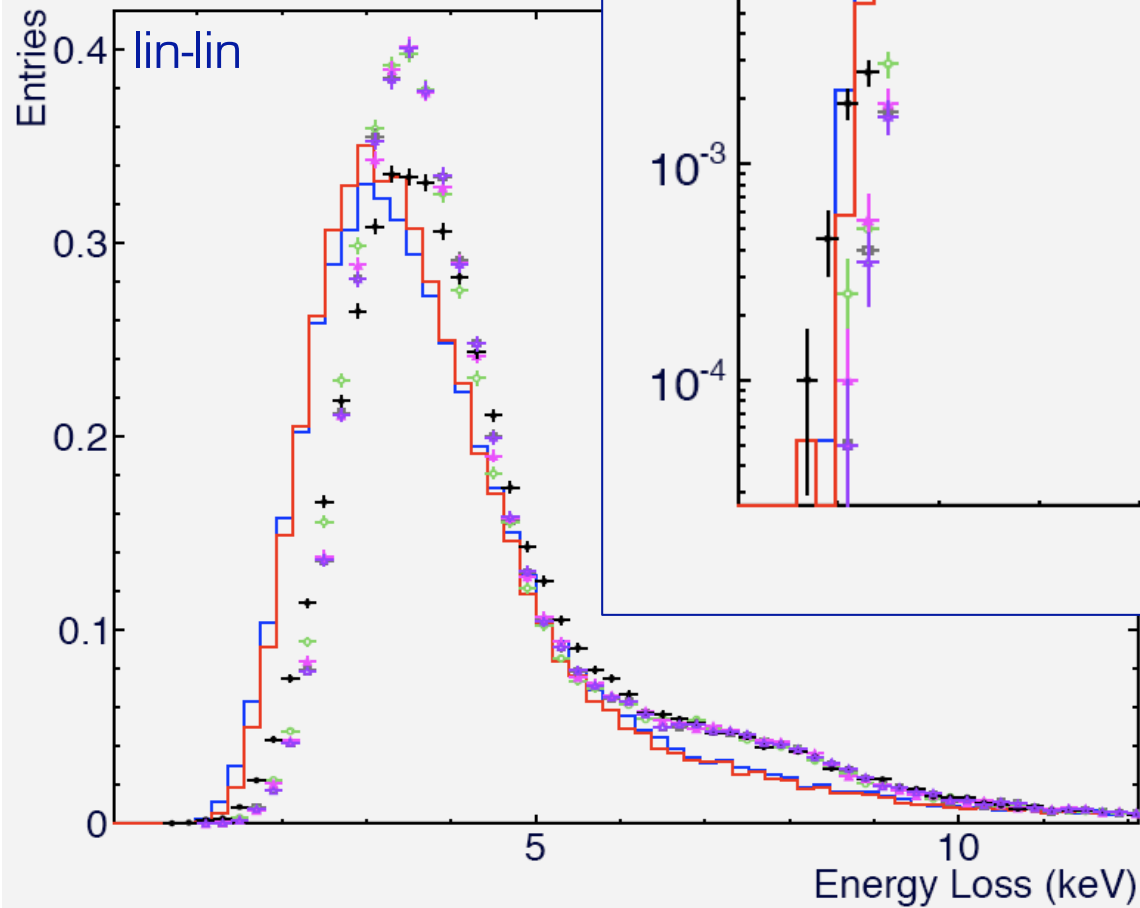
G4 Physics Lists: **emstandard_opt0**
emstandard_opt3
emlivermore
empenelope
PAI

HEED: **PAI**
PAIR

Description:

Ionization energy loss distribution produced by electrons with a momentum of 25 GeV/c in a gas mixture: 80% Ar and 20% CO₂, with 1.5 cm thickness.

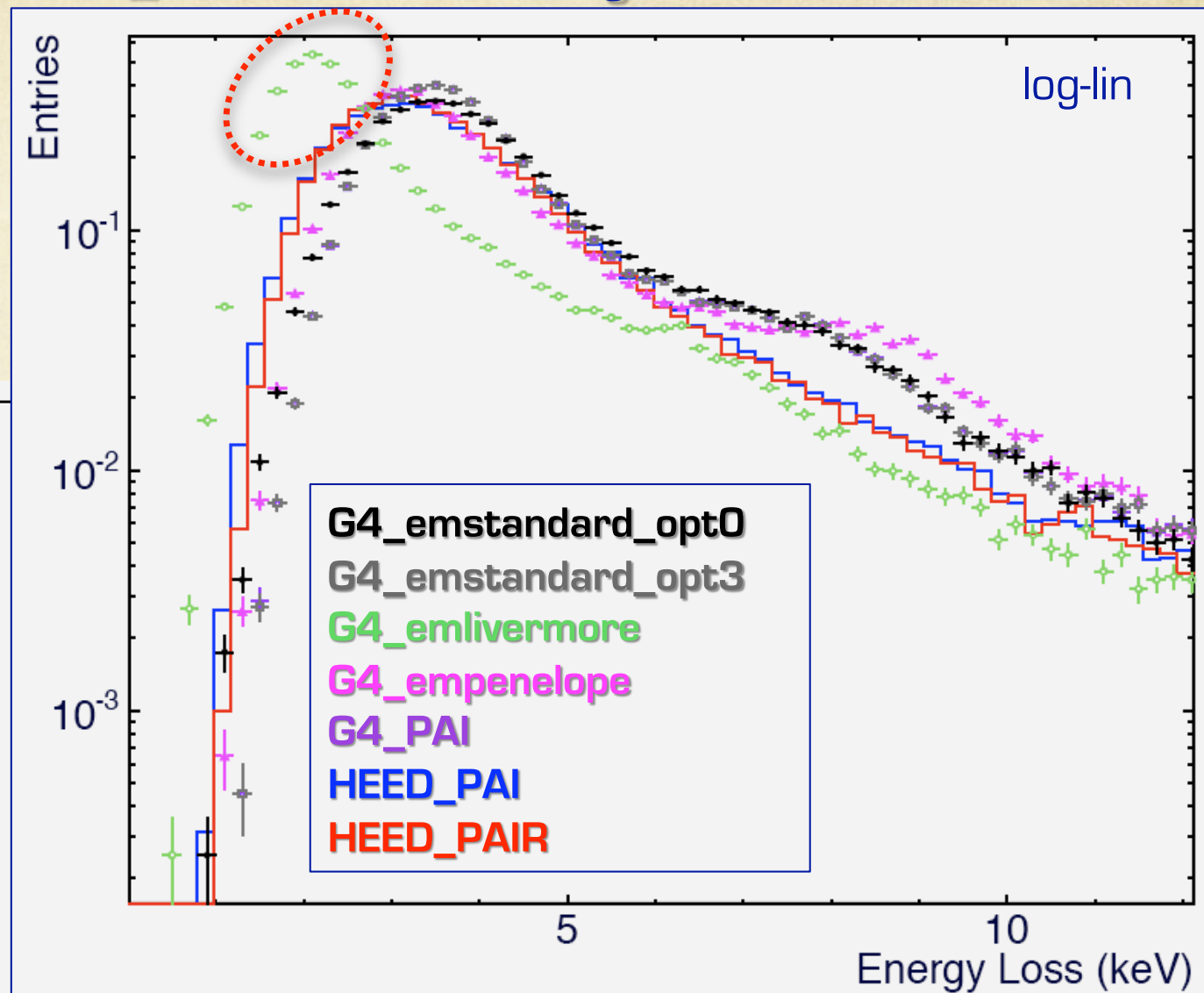
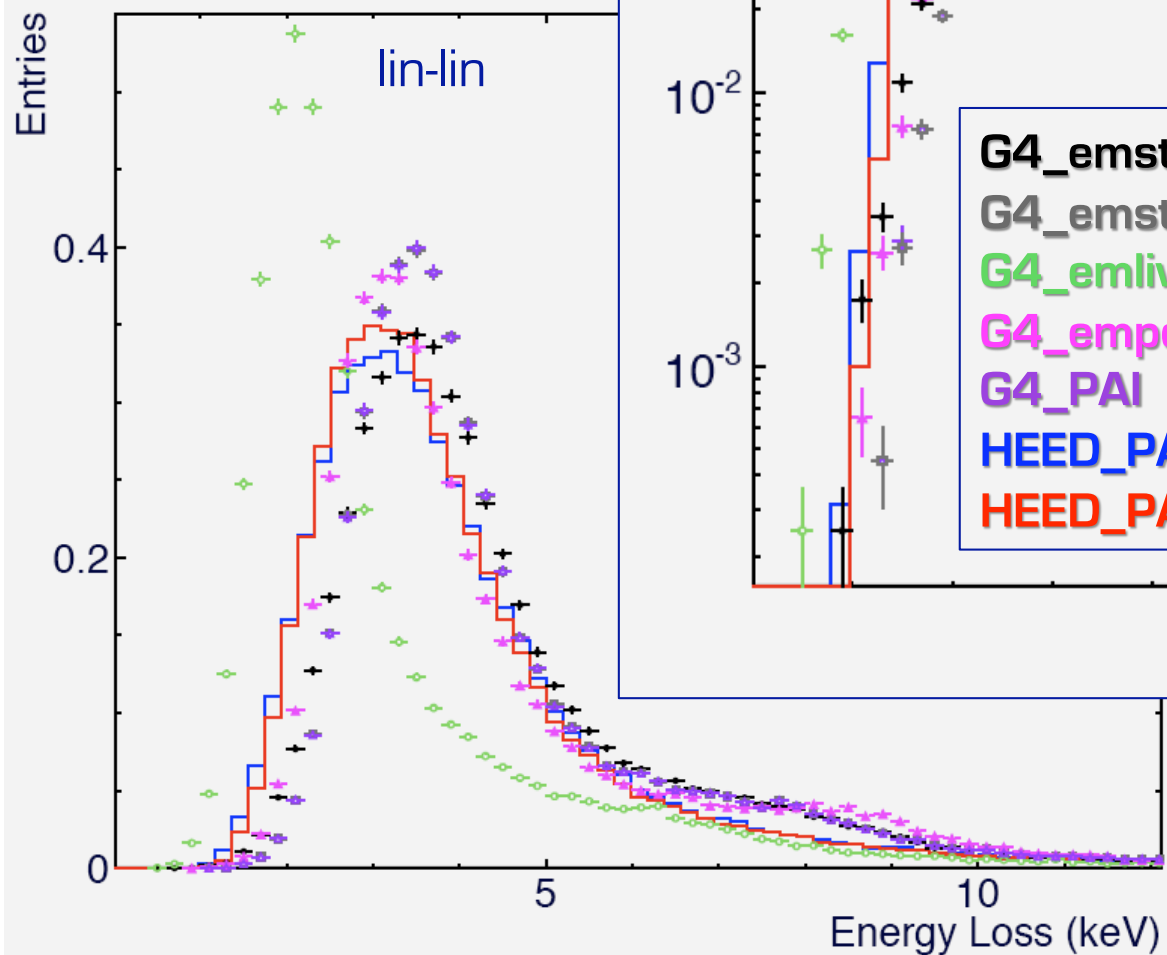
G4 & HEED : e^- 25GeV _1.5cm Natural Argon



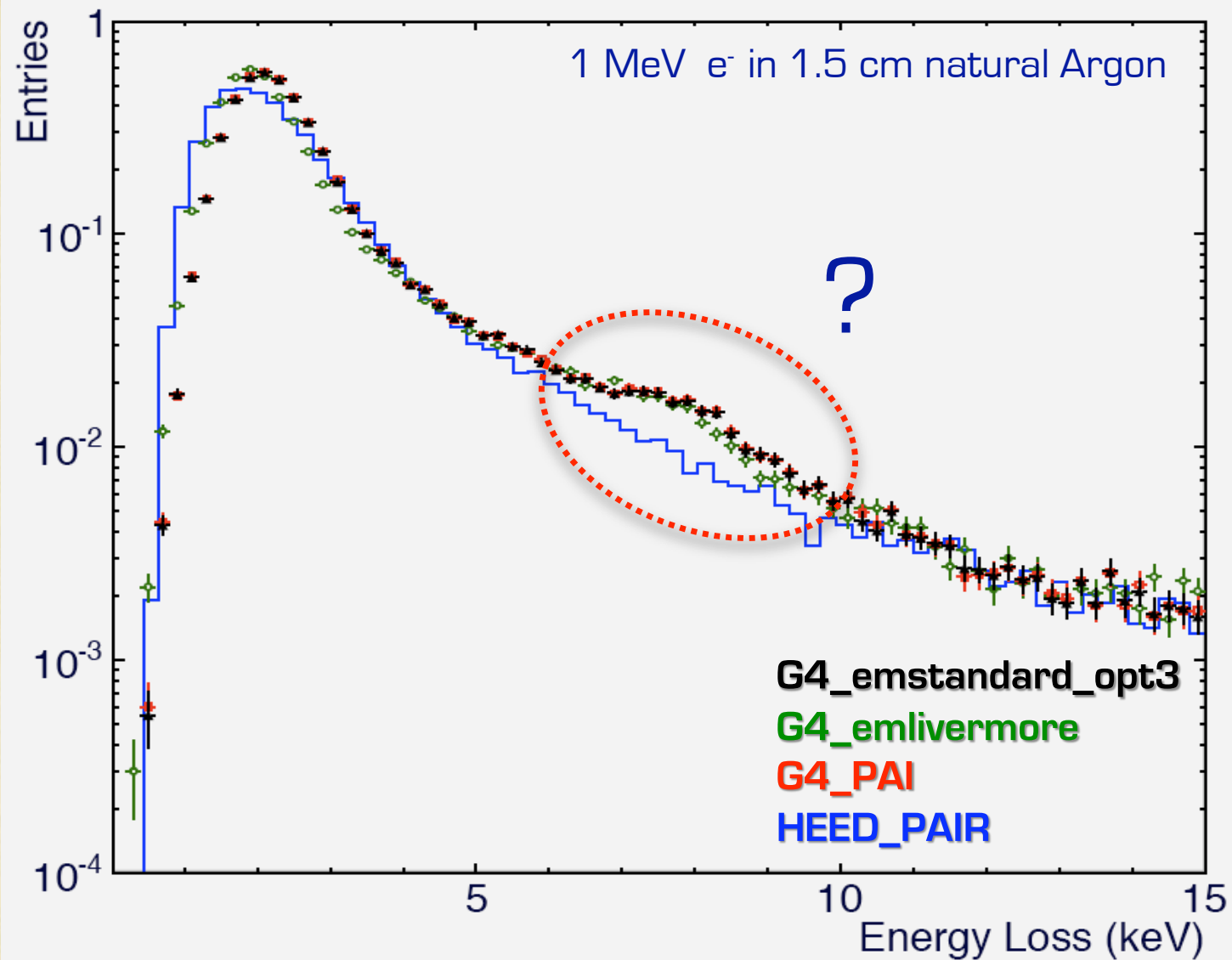
A. emlivermore's Energy-dependent behavior

- *Livermore model should not be used in the energy range 1MeV - 5GeV, due to lack of data*

G4 & HEED : e^- 500MeV _ 1.5cm Natural Argon

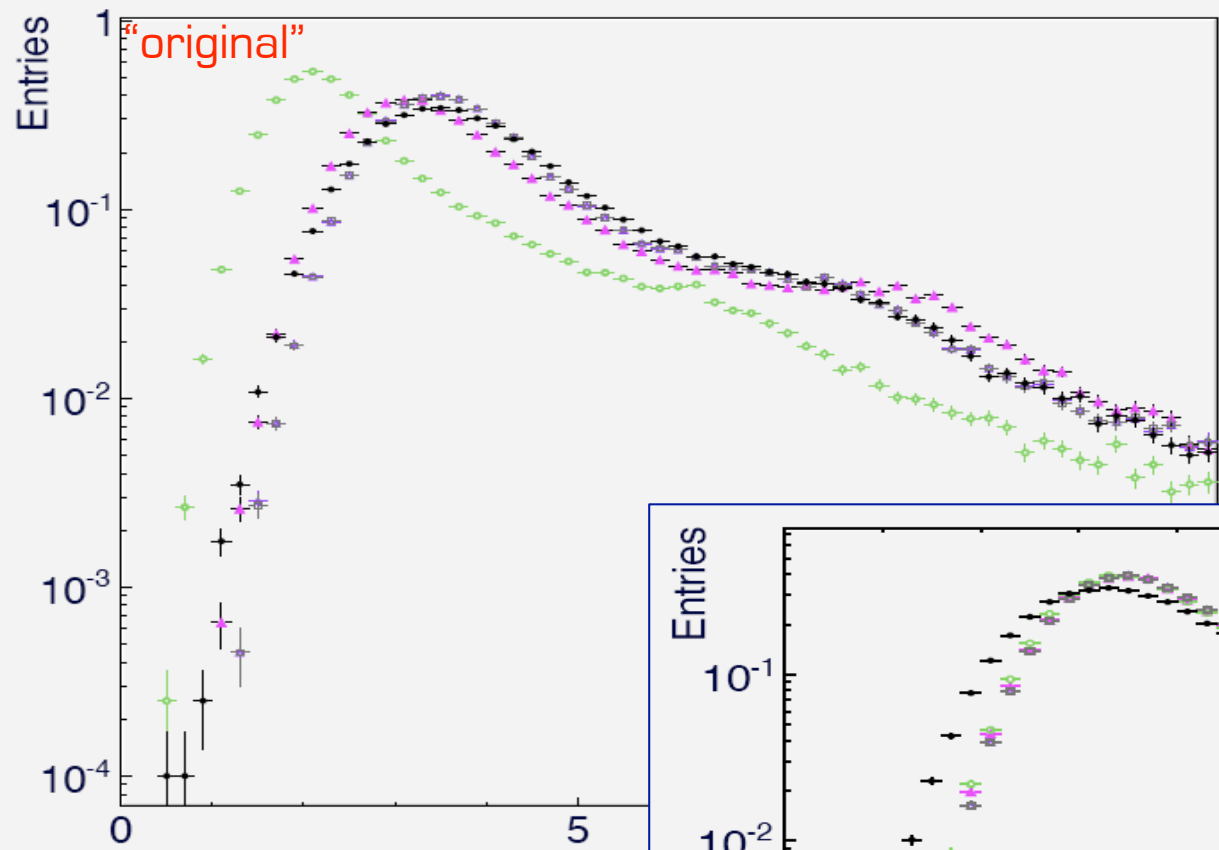


B. The “second peak”

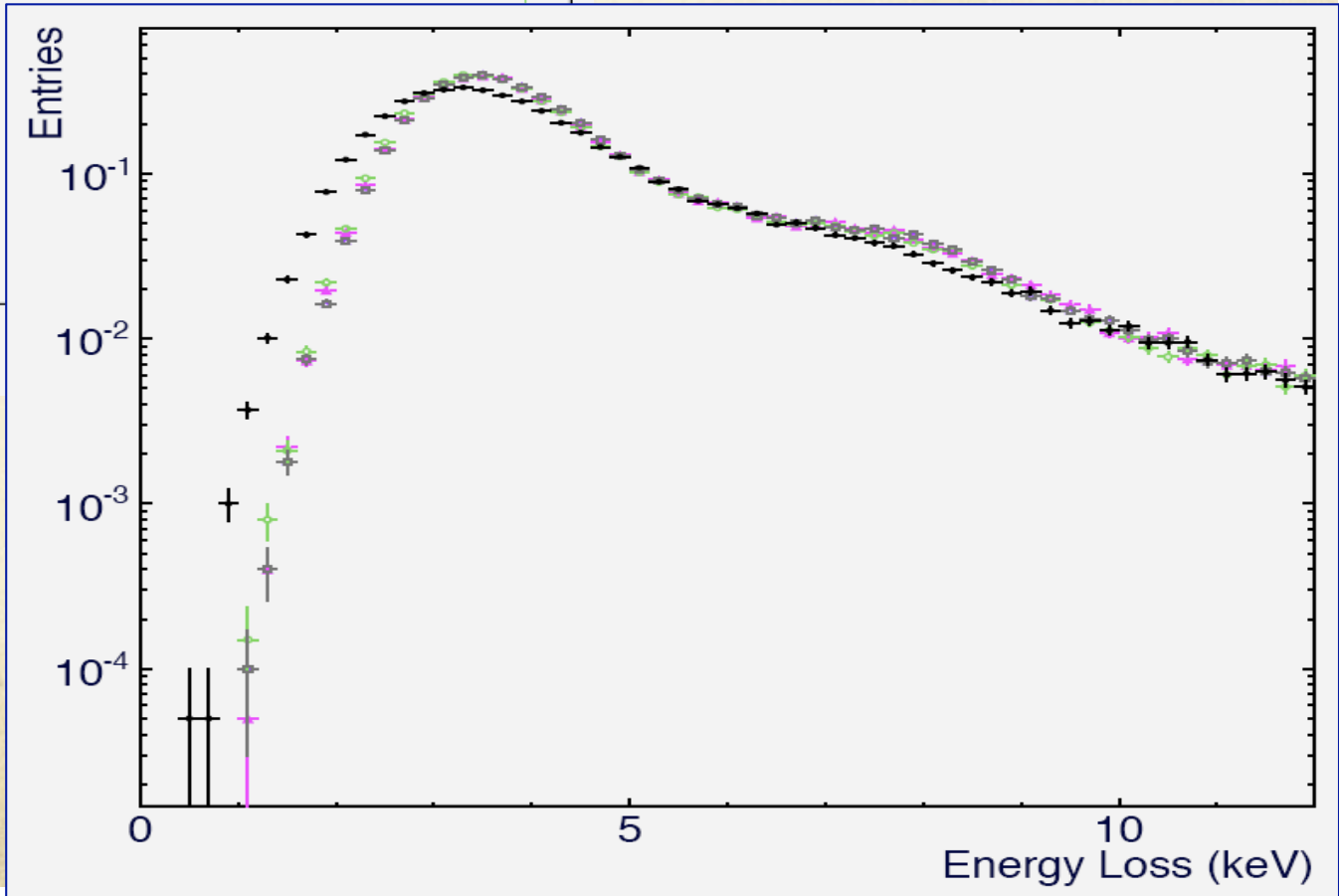


- Secondaries
- Thickness
- Processes
- Cuts

G4: e⁻ 500MeV _ 1.5cm _ killSecondaries

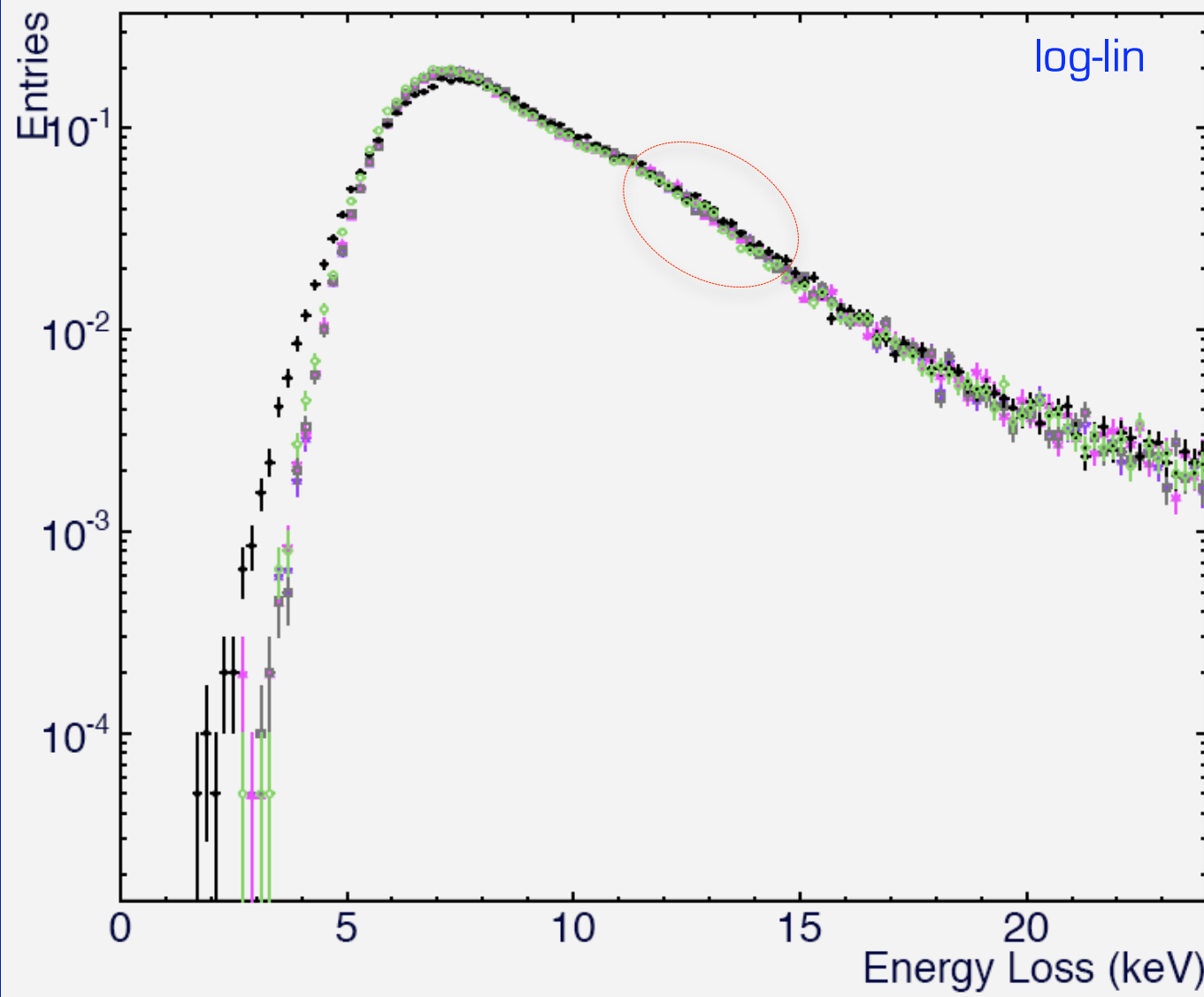
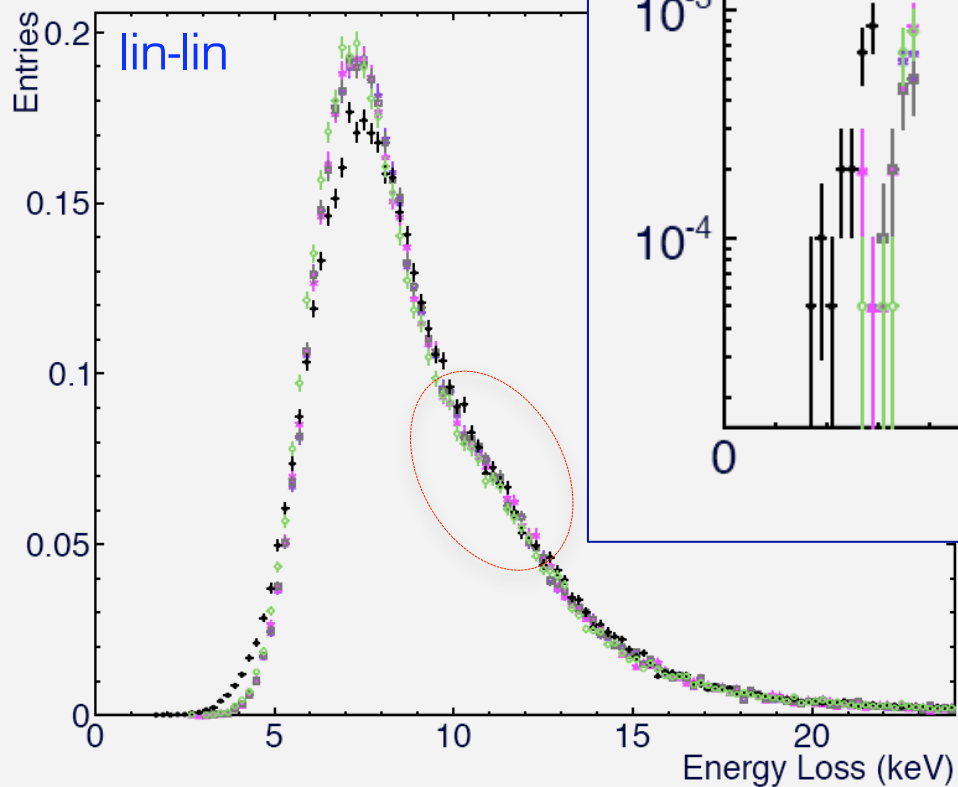


- G4_emstandard_opt0
- G4_emstandard_opt3
- G4_emlivermore
- G4_empenelope
- G4_PA1

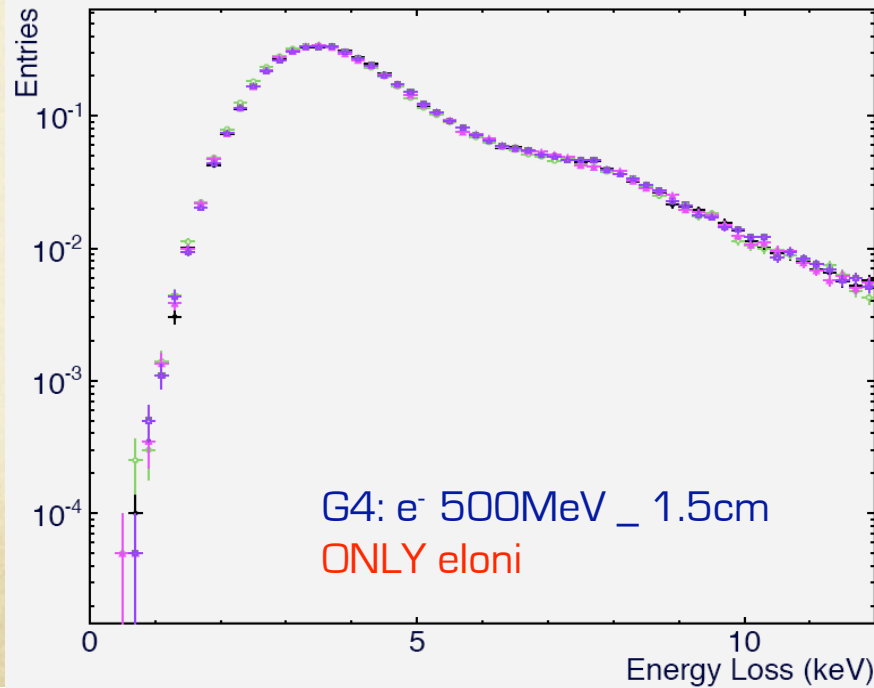
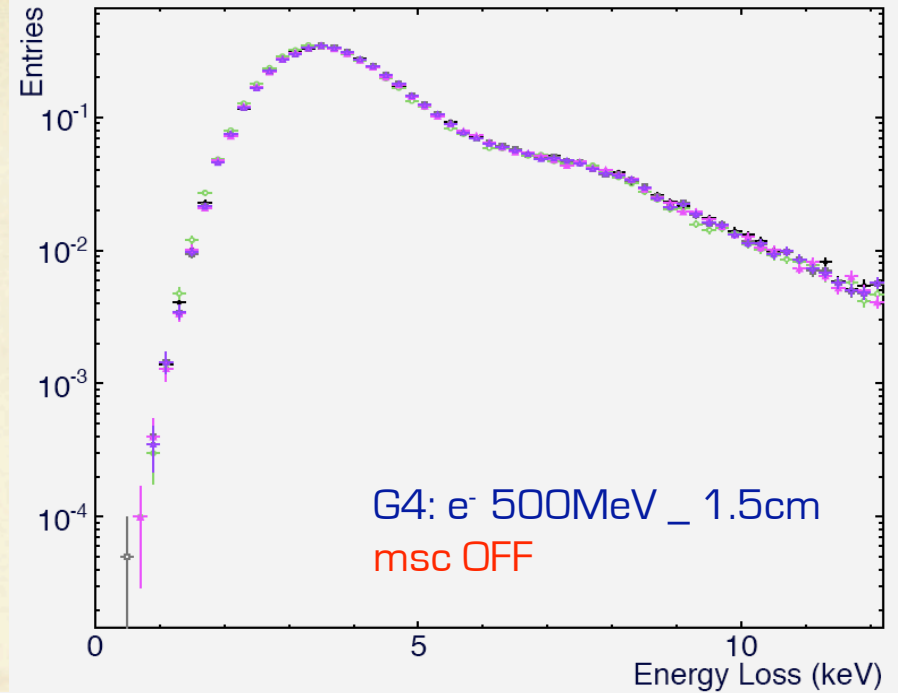
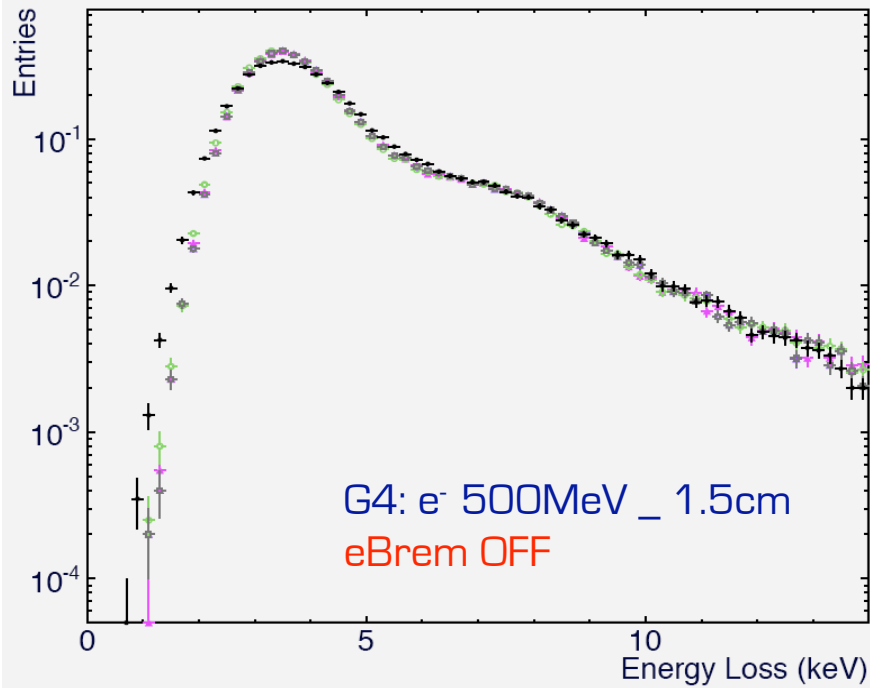


G4: e⁻ 500MeV _ 3cm _ DoubleThickness

G4_emstandard_opt0
G4_emstandard_opt3
G4_emlivermore
G4_empenelope
G4_PA1

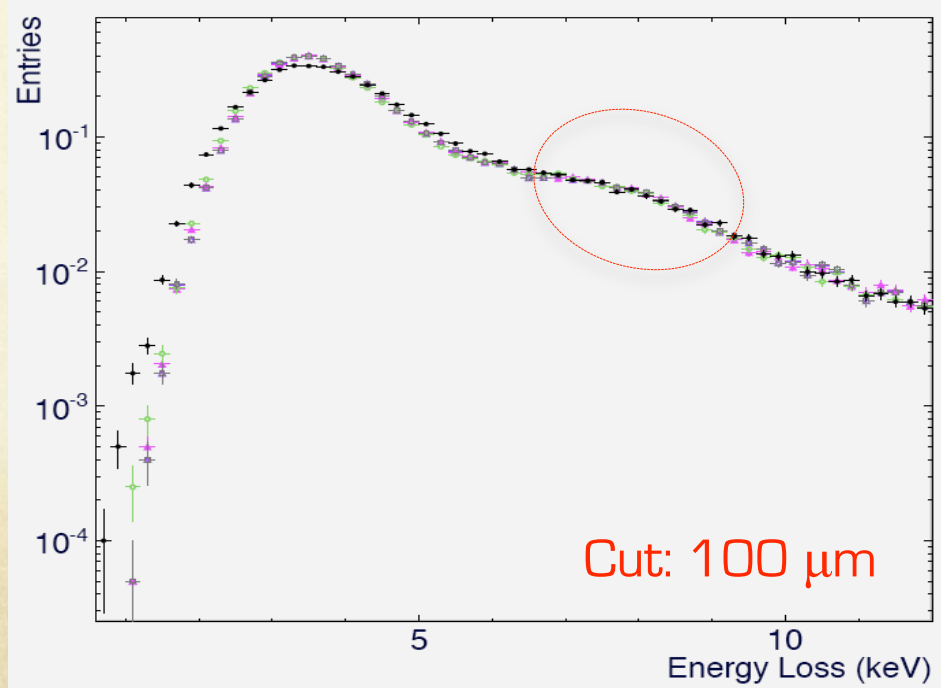
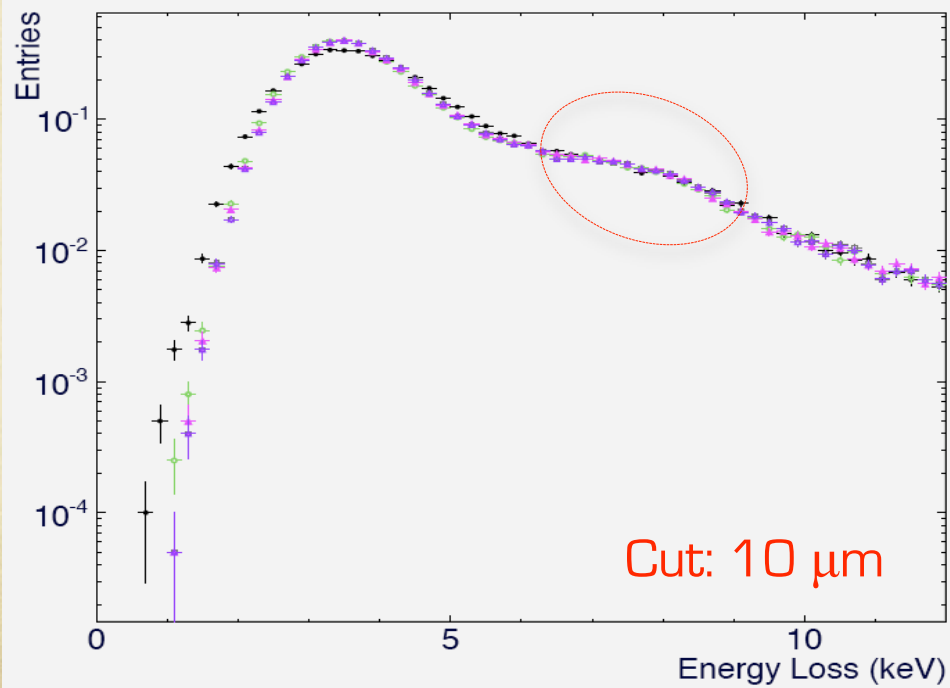
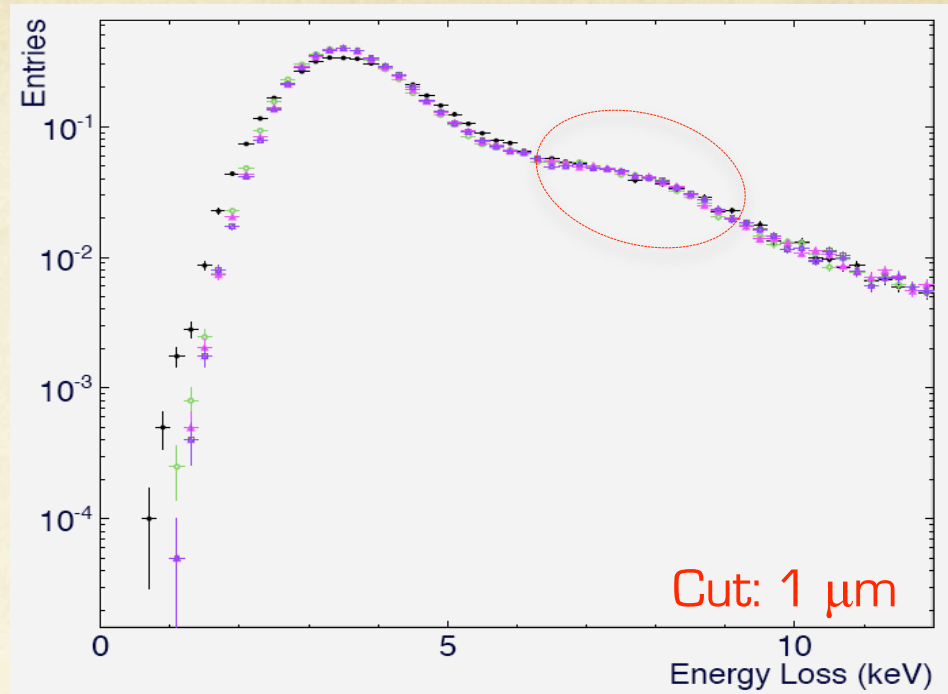
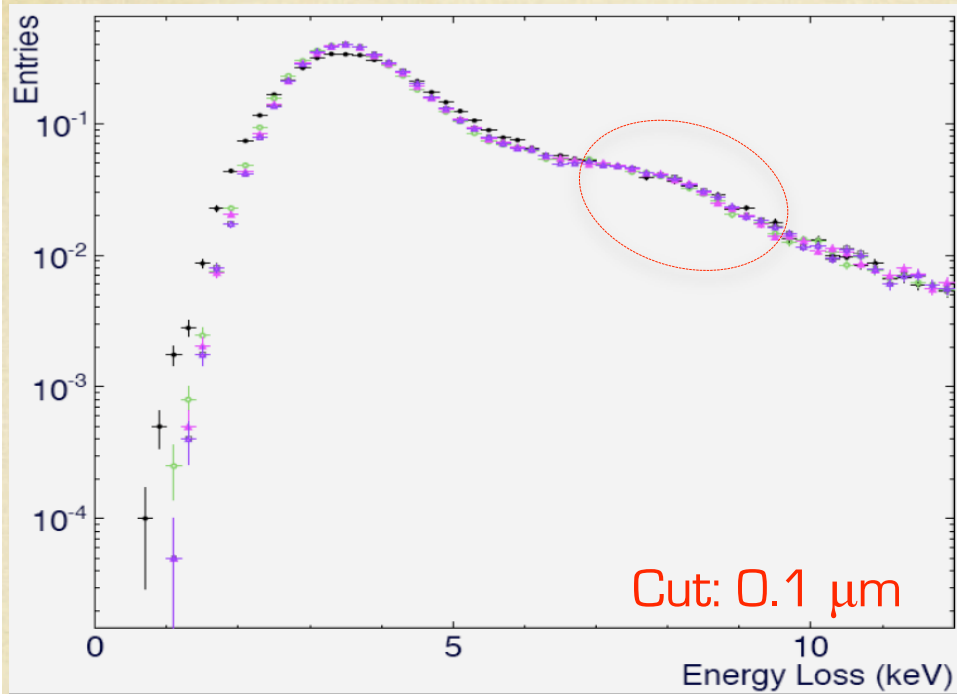


G4: e⁻ 500MeV _ 1.5cm _ Inactivate Processes

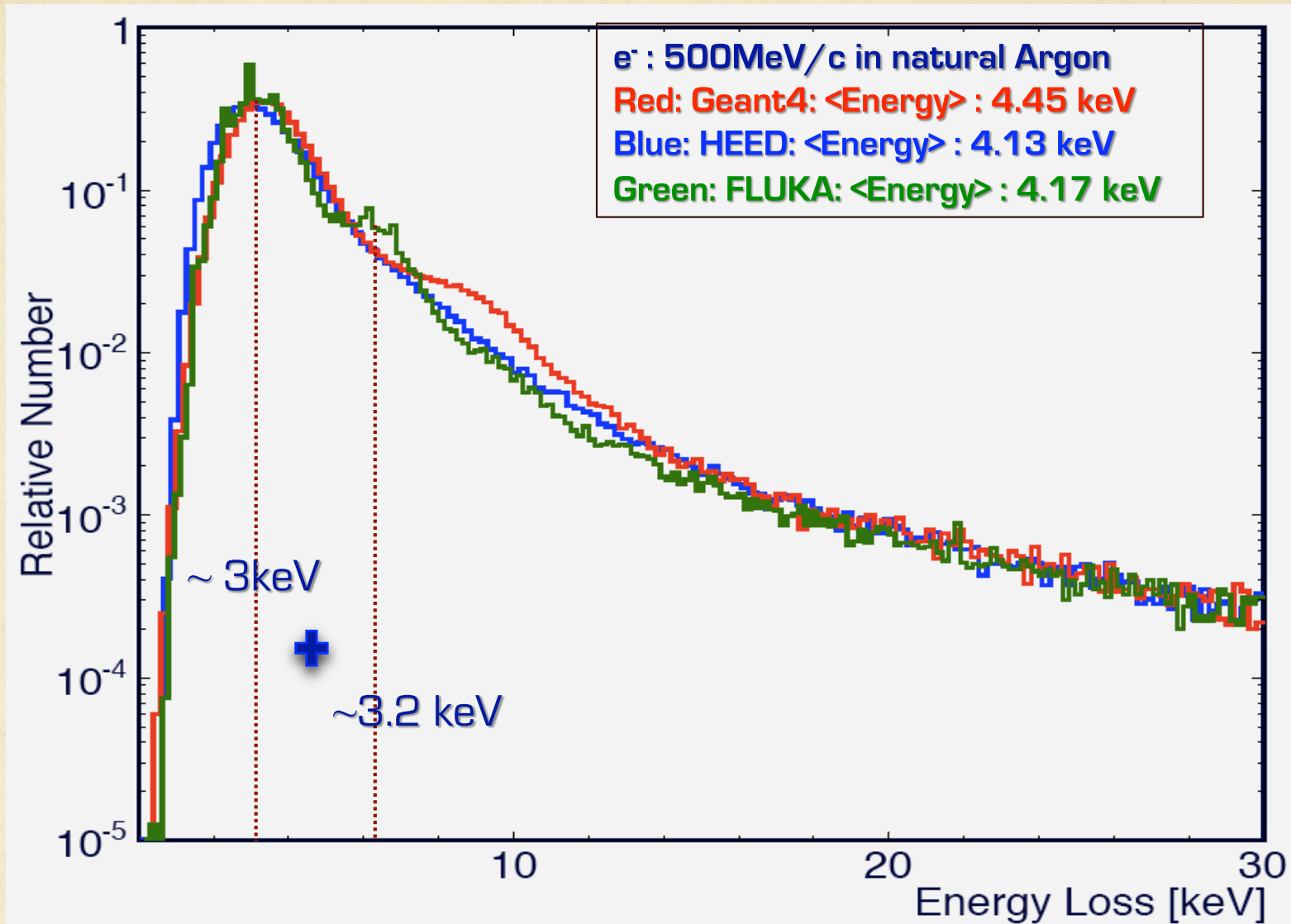


G4_emstandard_opt0
G4_emstandard_opt3
G4_emlivermore
G4_empenelope
G4_PA1

G4: e⁻ 500MeV _ 1.5cm _ Change Cuts

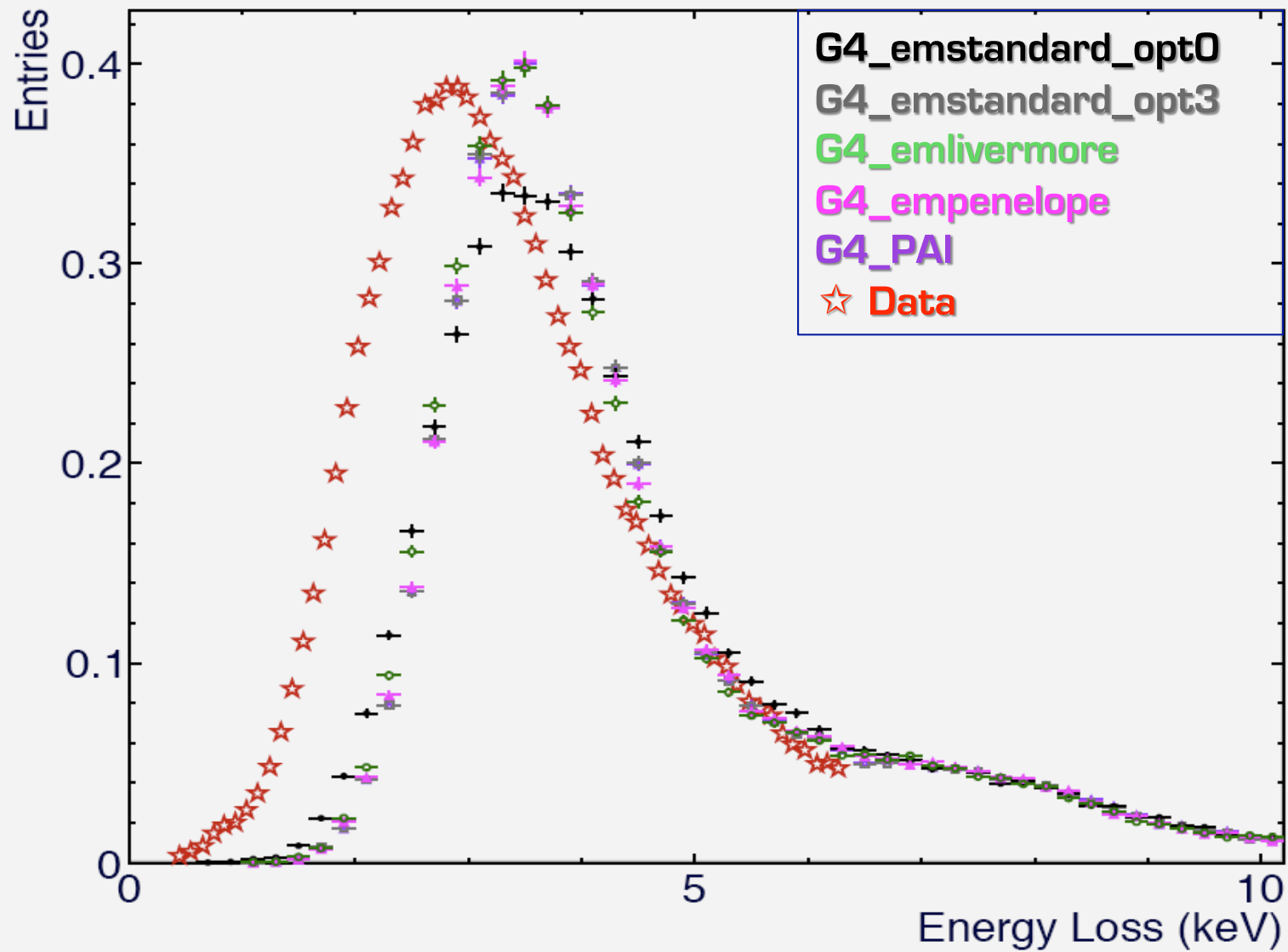


Comparison between Geant4, HEED and FLUKA

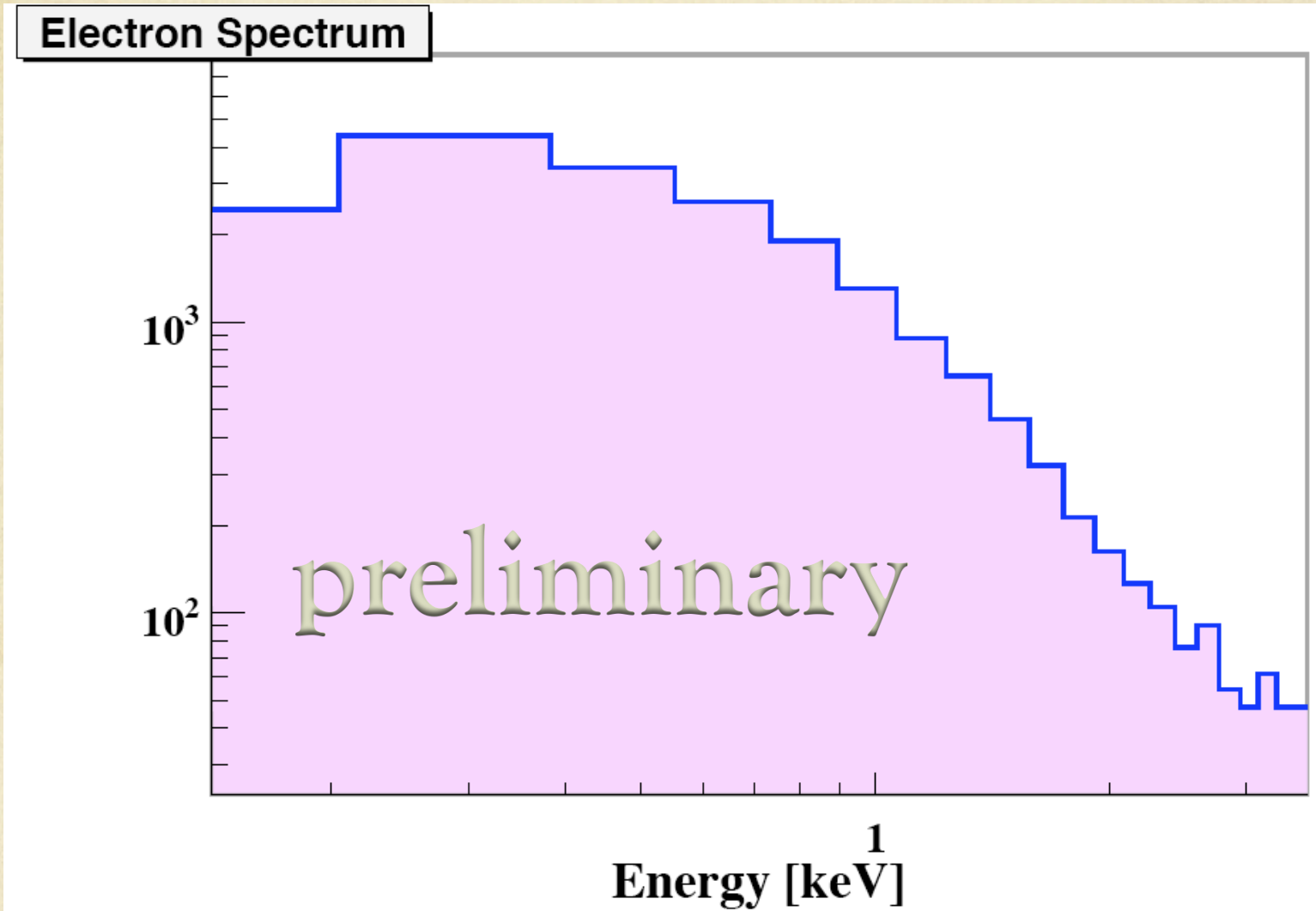


- General features: rather similar making the identification of the “shoulder” mandatory
- In search of beam data (a micromegas detector with appropriate thickness and good energy resolution ($\sim 20\%$) in a high energy beam)

data_e-_25GeV.txt



200 GeV muons in 3mm of Ar / iC4H10 (95 / 5)



Thanks to Ambroise Espargiliere and Max Chefdeville

Thank you for your attention

