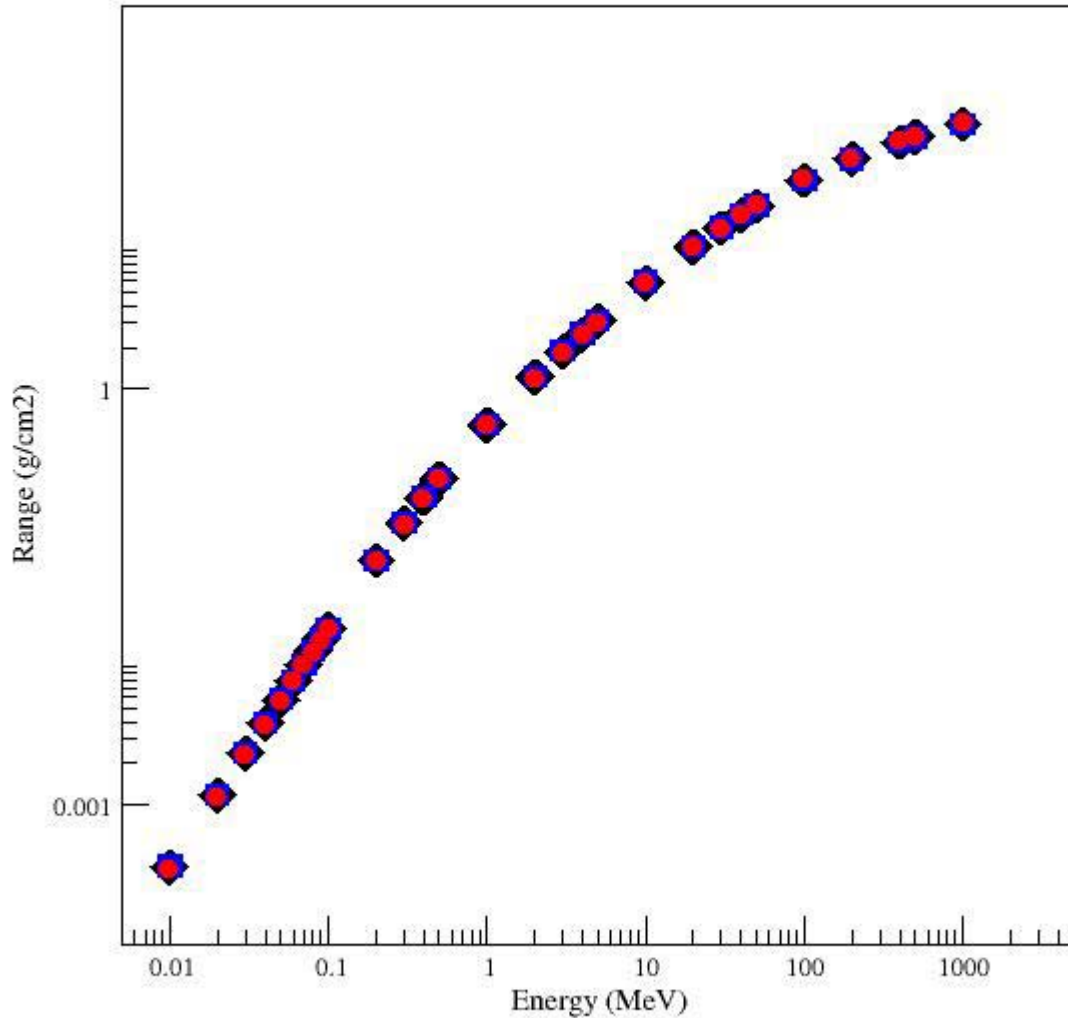


# ELECTRONS – CSDA RANGE

# CSDA Range - Al

Electrons - CSDA Range - Aluminium

(Geant4-05-02)



◆ NIST-ESTAR

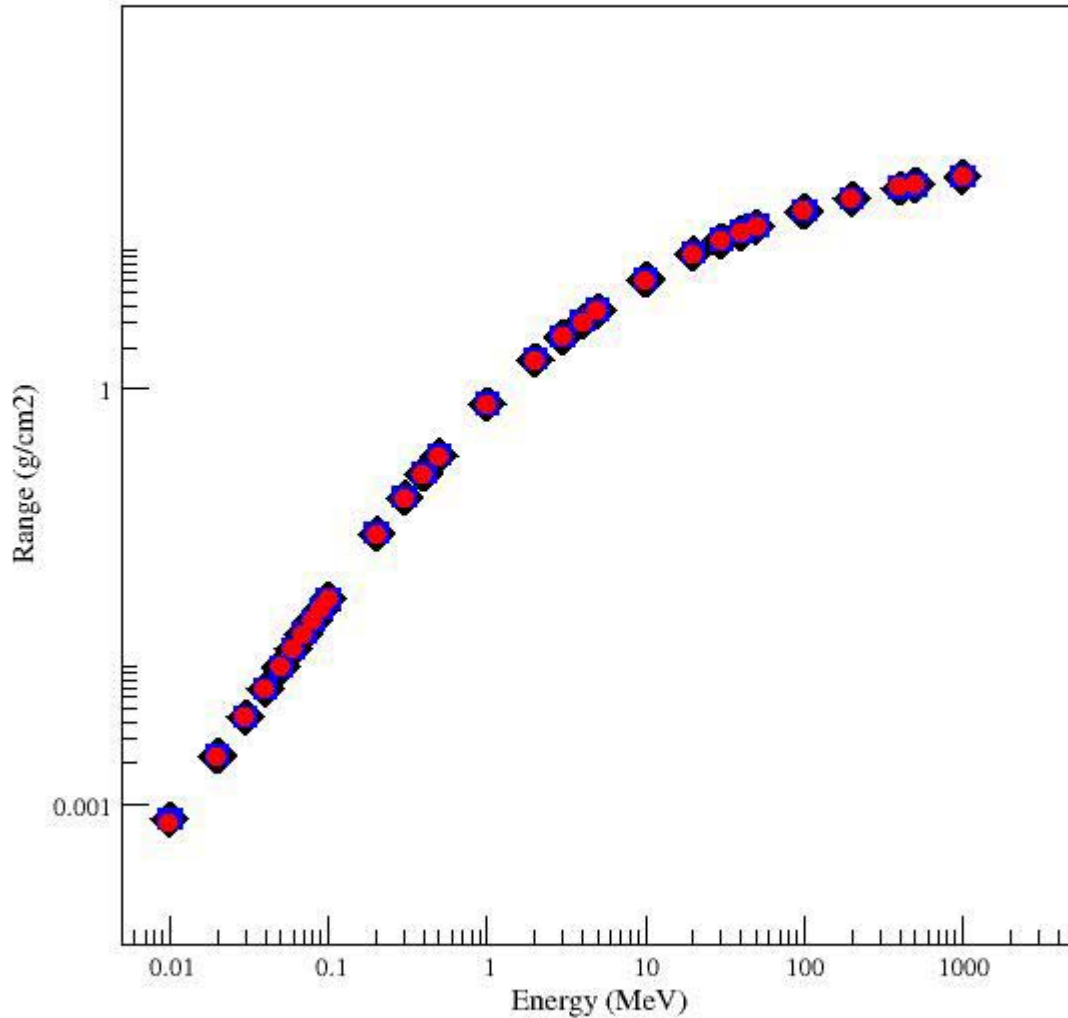
■ G4 Standard

● G4 LowE

# CSDA Range - Au

Electrons - CSDA Range - Gold

(Geant4-05-02)



◆ NIST-ESTAR

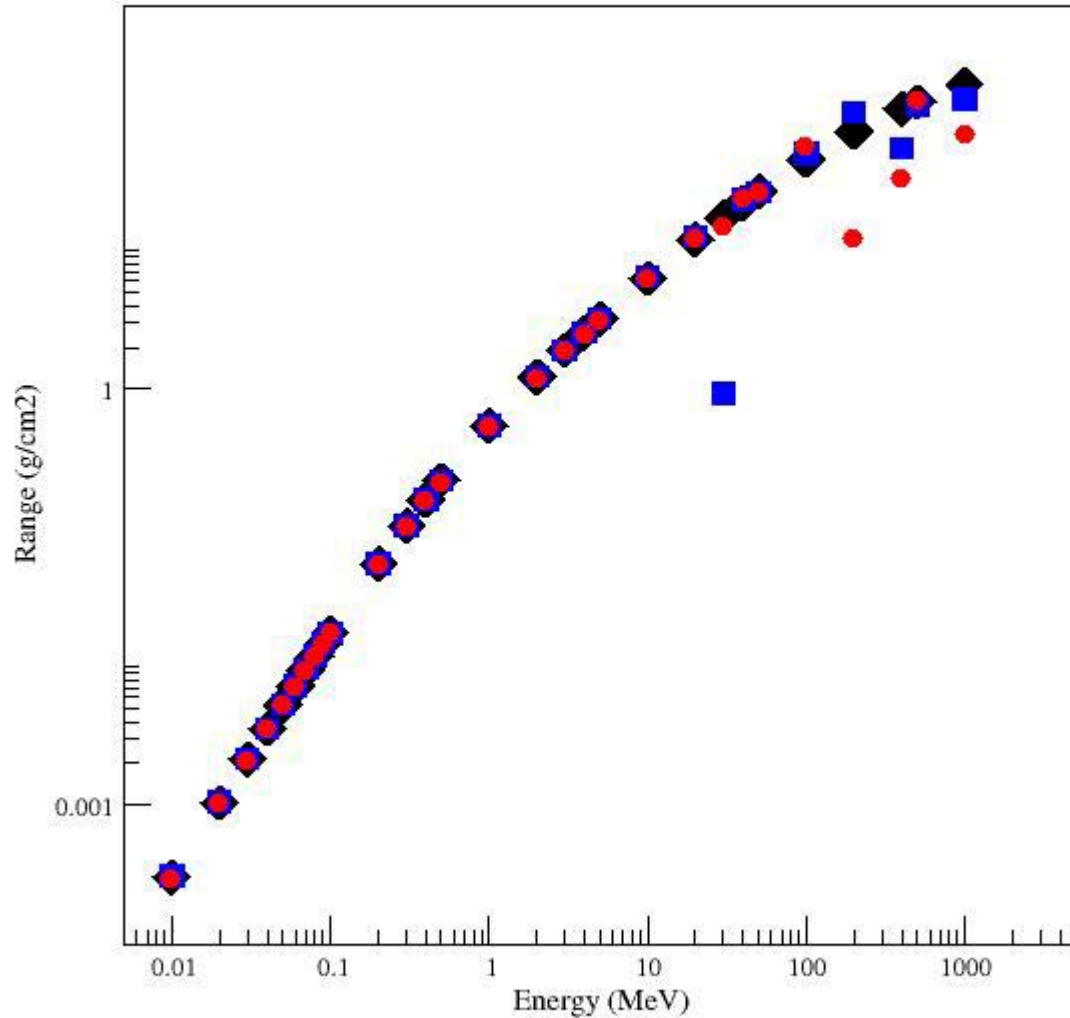
■ G4 Standard

● G4 LowE

# CSDA Range - Be

Electrons - CSDA Range - Beryllium

(Geant4-05-02)



◆ NIST-ESTAR

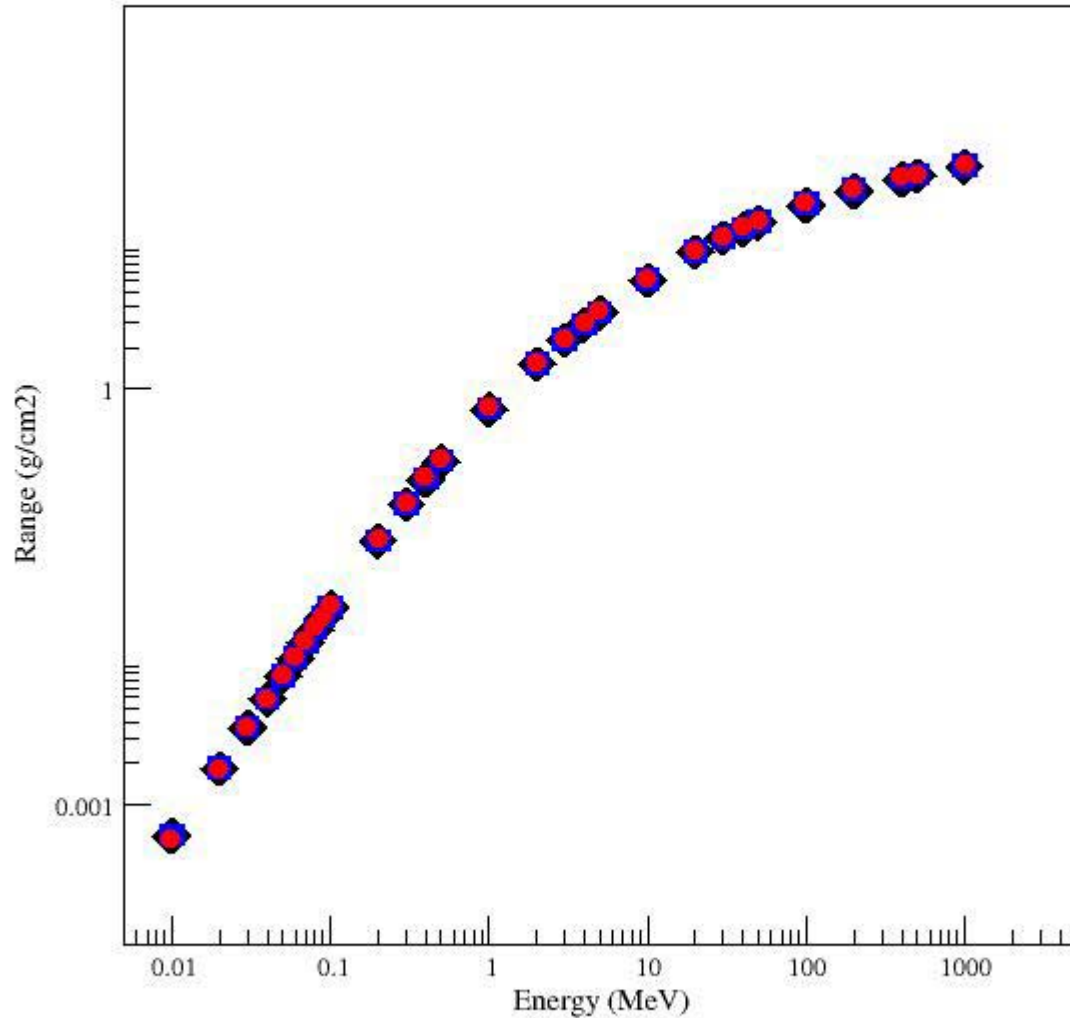
■ G4 Standard

● G4 LowE

# CSDA Range - Cs

Electrons - CSDA Range - Cesium

(Geant4-05-02)



◆ NIST-ESTAR

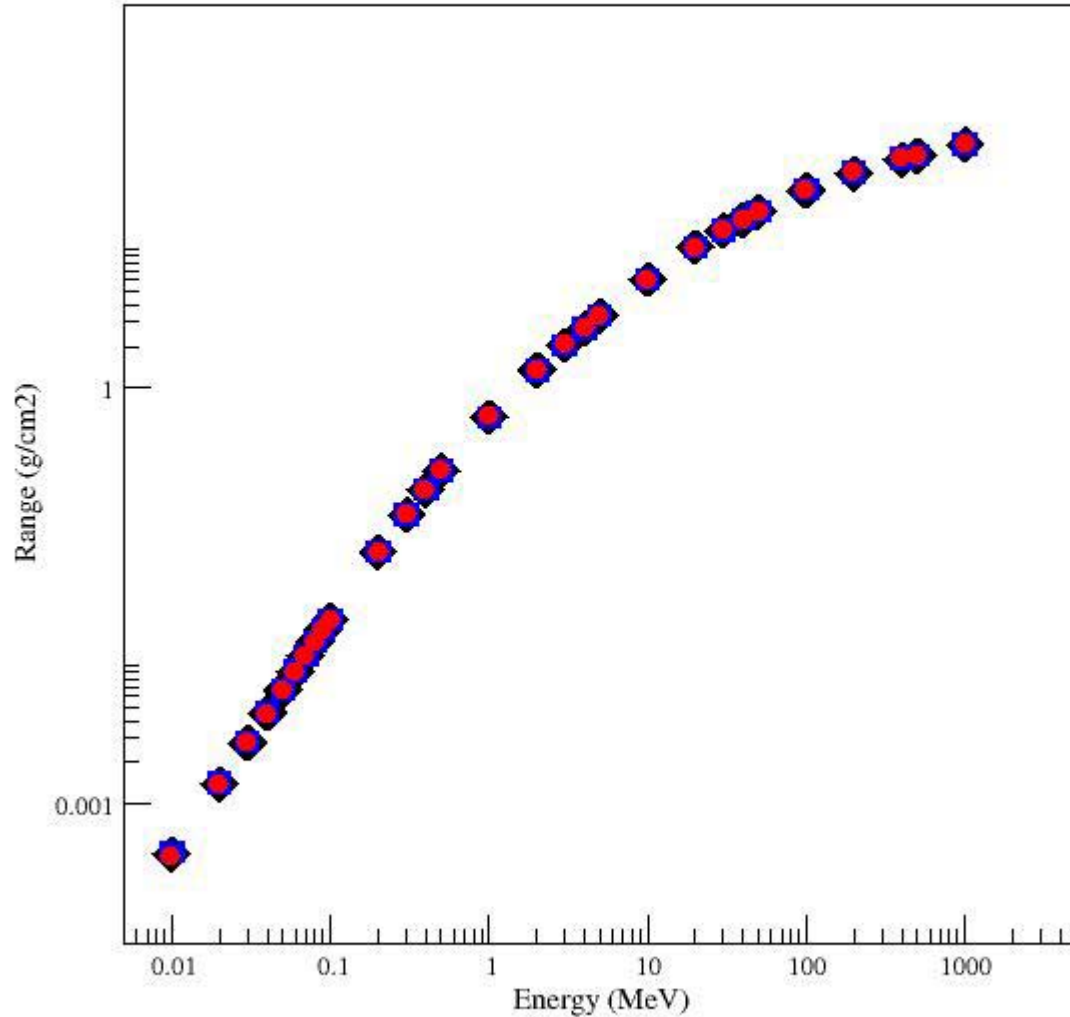
■ G4 Standard

● G4 LowE

# CSDA Range - Fe

Electrons - CSDA Range - Iron

(Geant4-05-02)



◆ NIST-ESTAR

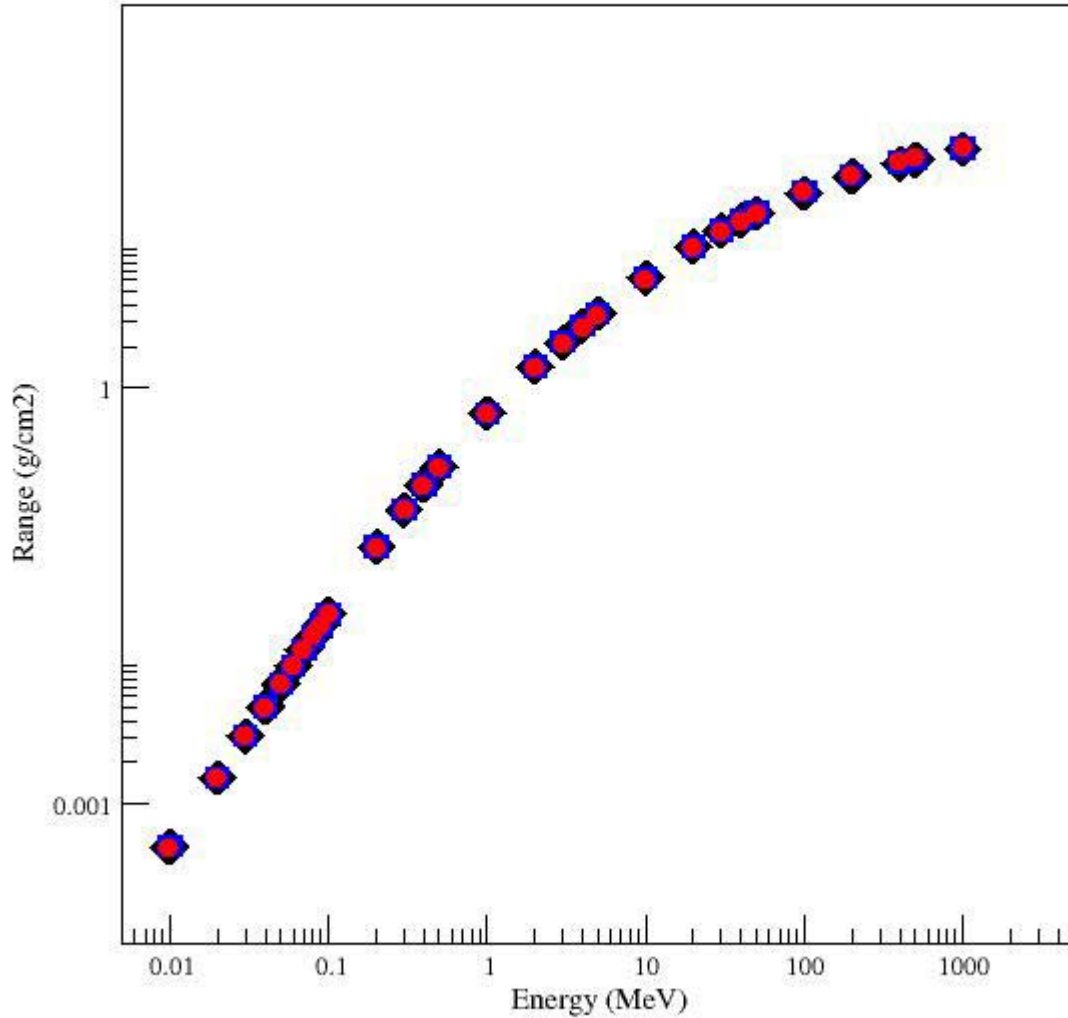
■ G4 Standard

● G4 LowE

# CSDA Range - Ge

Electrons - CSDA Range - Germanium

(Geant4-05-02)



◆ NIST-ESTAR

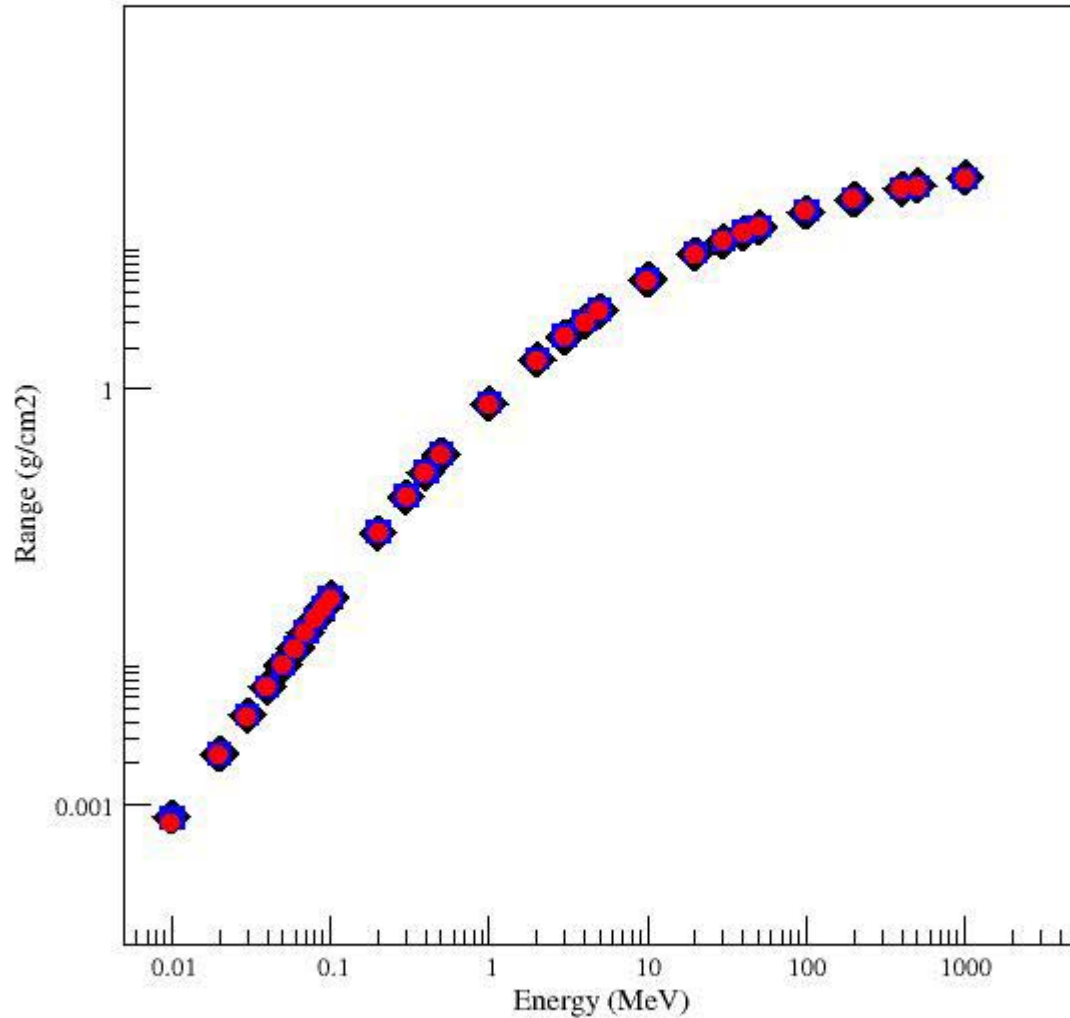
■ G4 Standard

● G4 LowE

# CSDA Range - Pb

Electrons - CSDA Range - Lead

(Geant4-05-02)



◆ NIST-ESTAR

■ G4 Standard

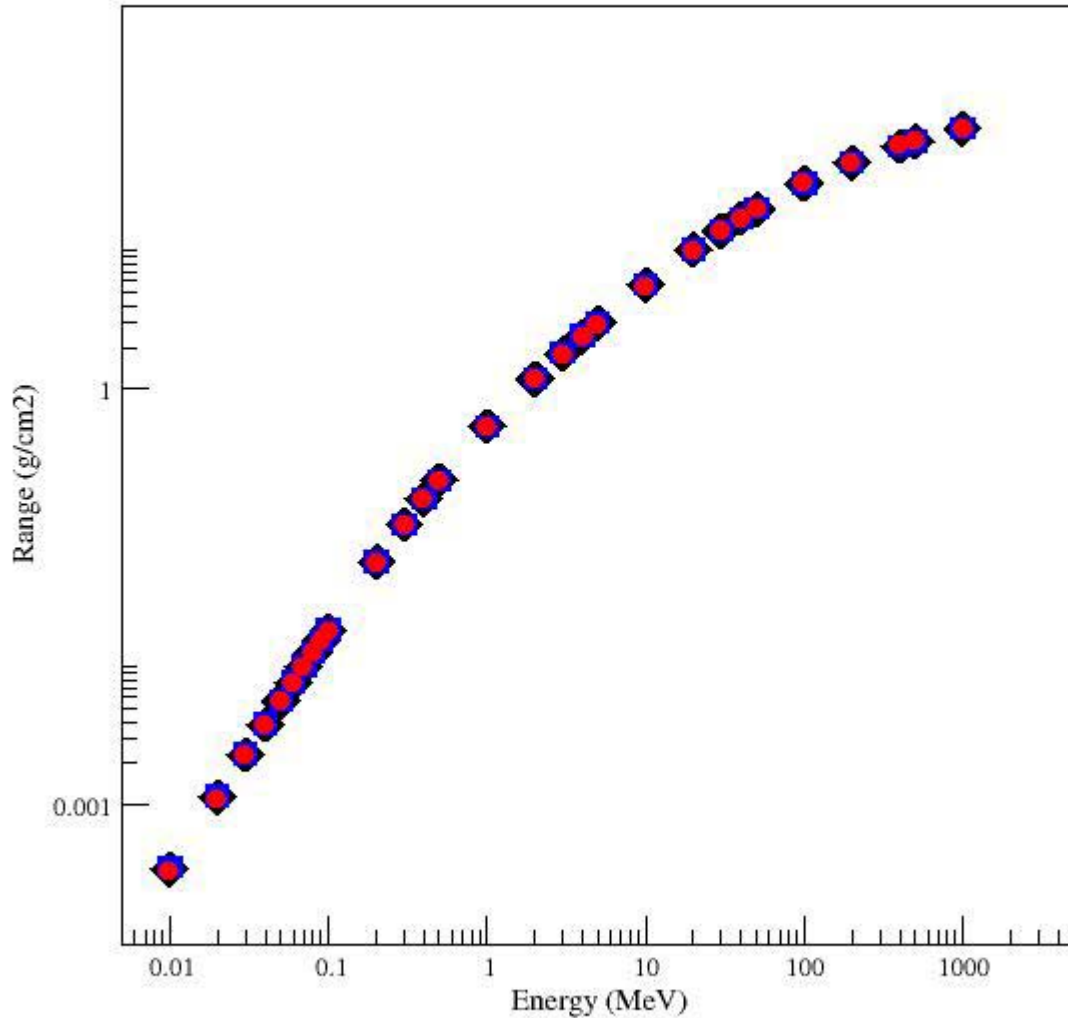
● G4 LowE



# CSDA Range - Si

Electrons - CSDA Range - Silicon

(Geant4-05-02)



◆ NIST-ESTAR

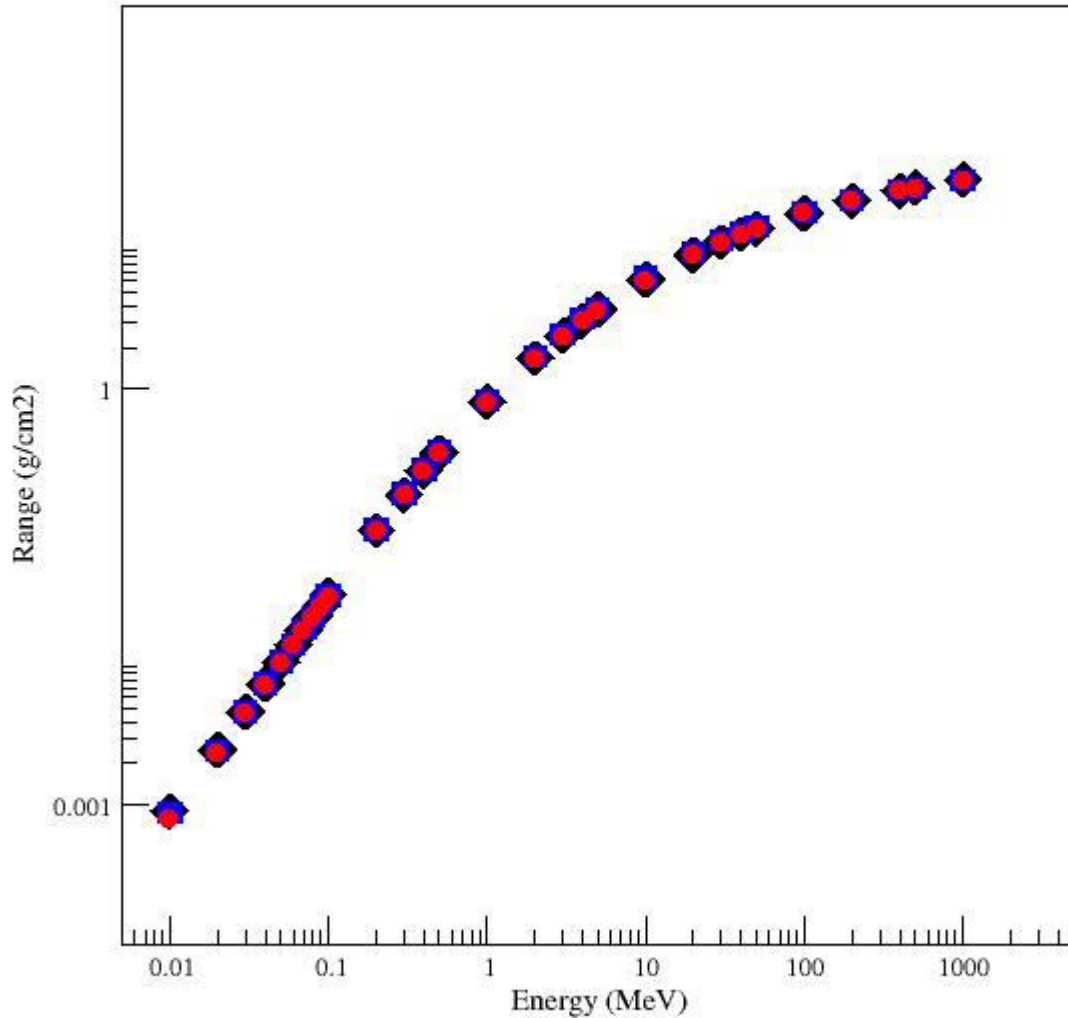
■ G4 Standard

● G4 LowE

# CSDA Range - U

Electrons - CSDA Range - Uranium

(Geant4-05-02)



◆ NIST-ESTAR

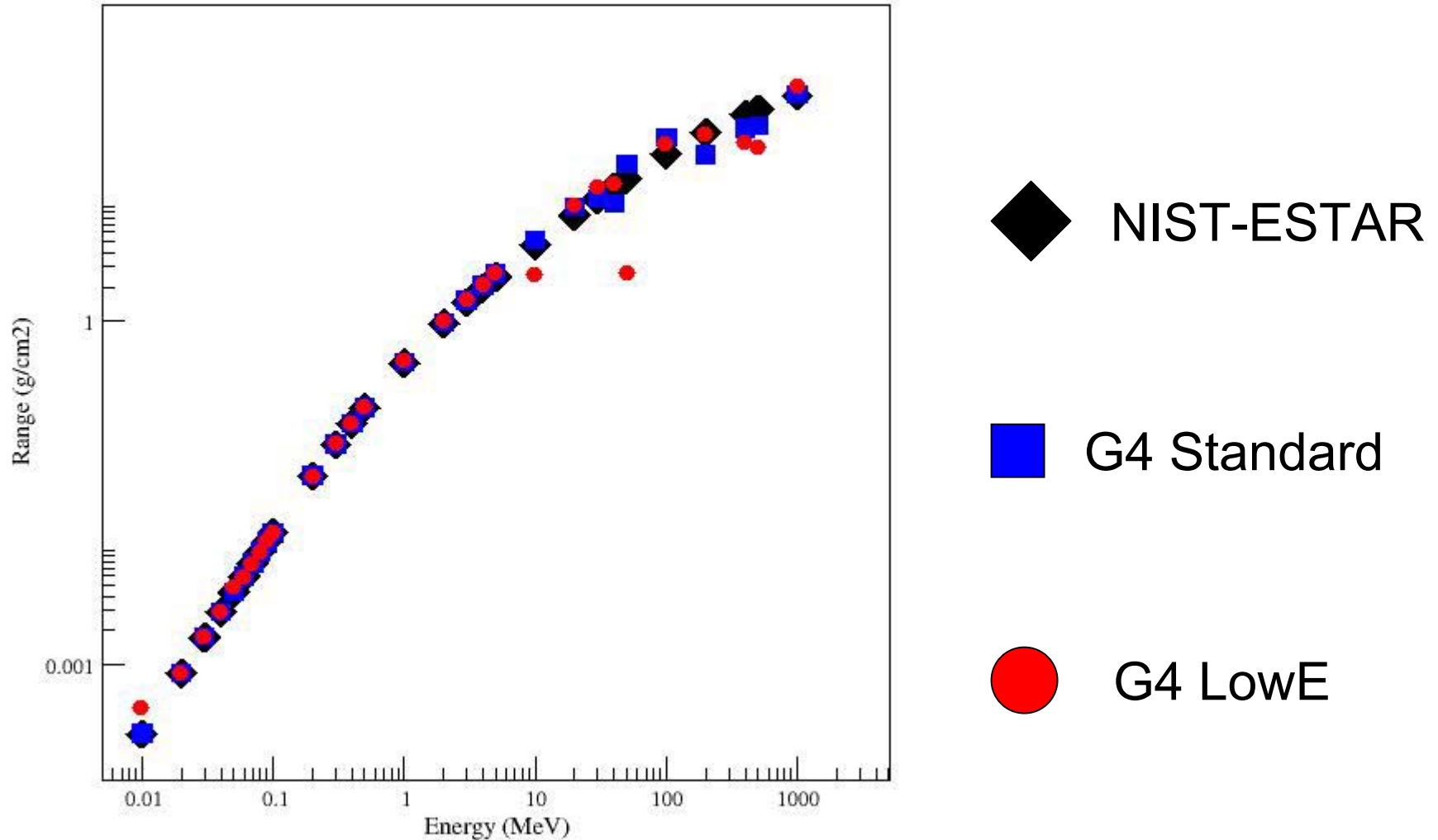
■ G4 Standard

● G4 LowE

# CSDA Range - Water

Electrons - CSDA Range - Water

(Geant4-05-02)

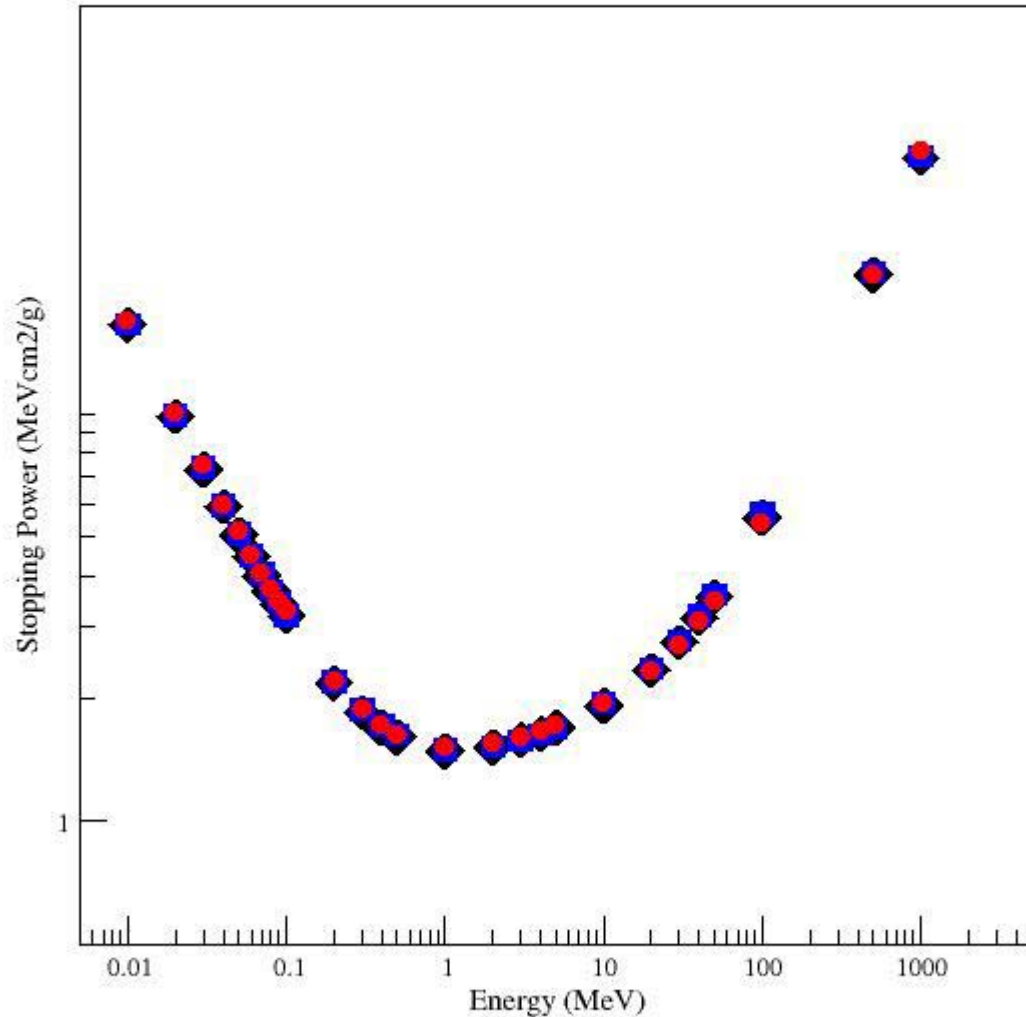


# ELECTRONS – STOPPING POWER

# Stopping Power - Al

Electrons - Stopping Power - Aluminium

(Geant4-05-02)



◆ NIST-ESTAR

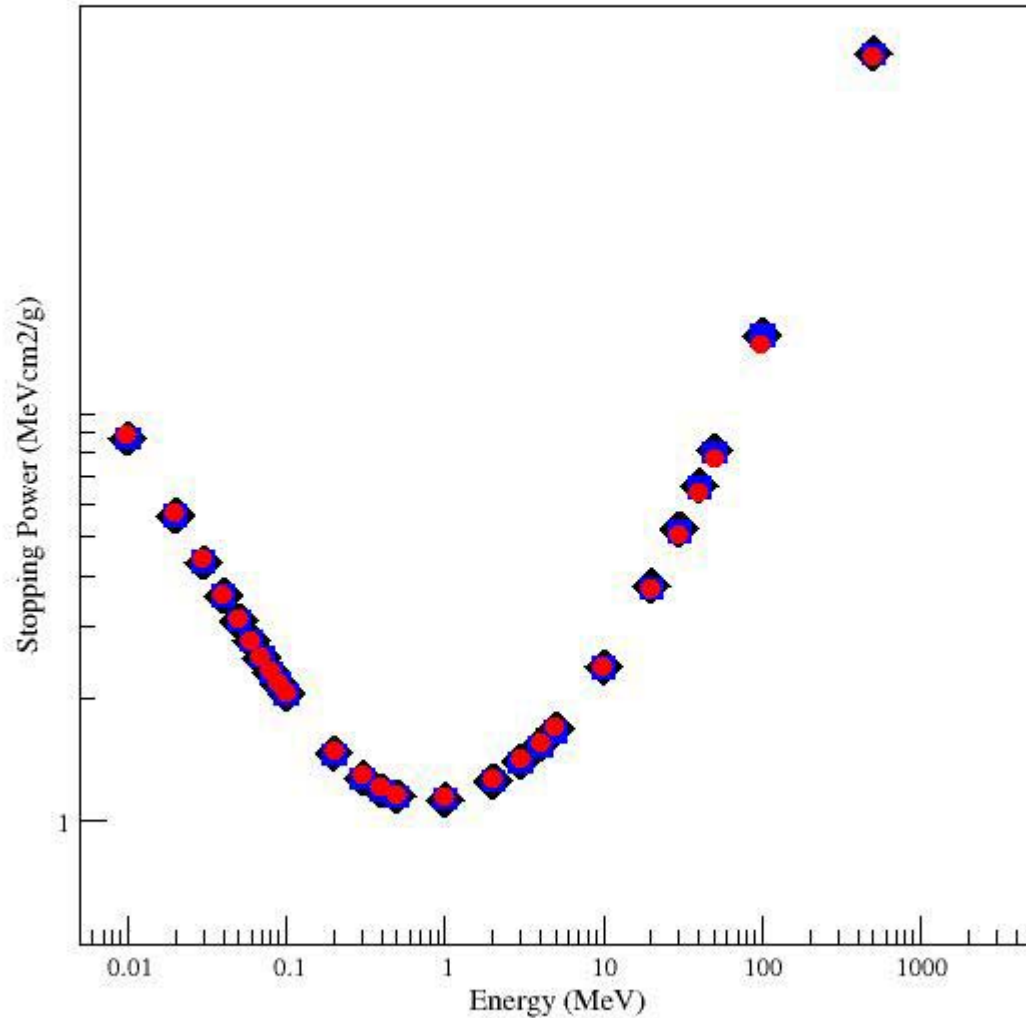
■ G4 Standard

● G4 LowE

# Stopping Power - Au

Electrons - Stopping Power - Gold

(Geant4-05-02)



◆ NIST-ESTAR

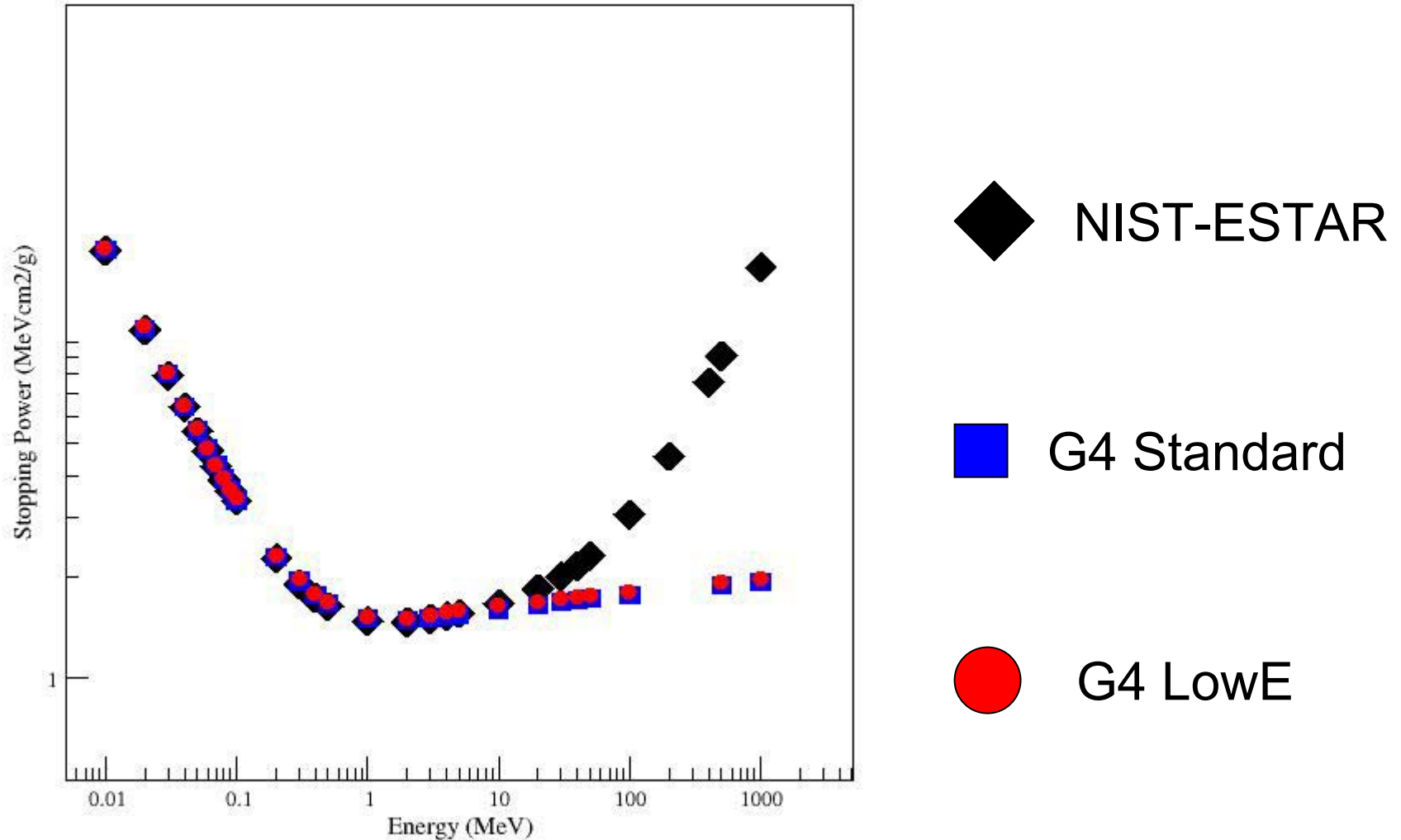
■ G4 Standard

● G4 LowE

# Stopping Power - Be

Electrons - Stopping Power - Beryllium

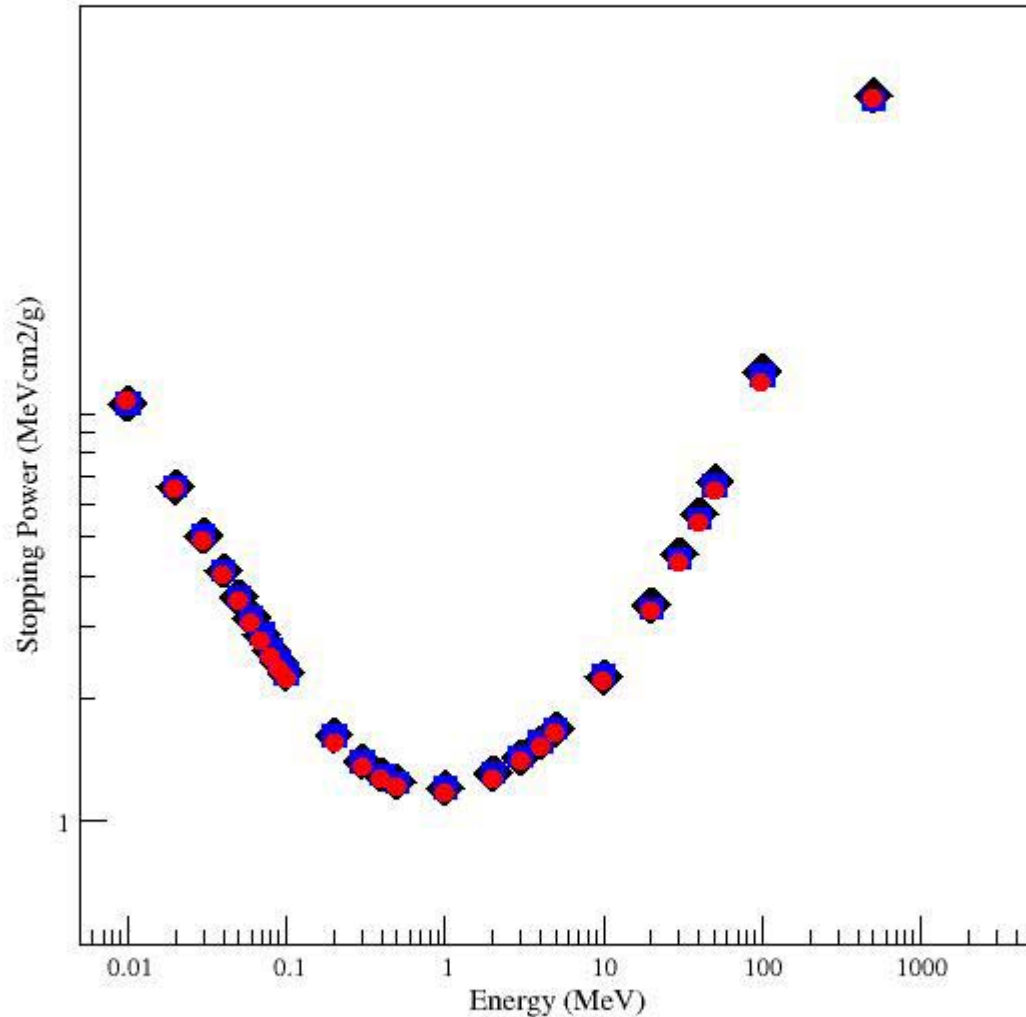
(Geant4-05-02)



# Stopping Power - Cs

Electrons - Stopping Power - Cesium

(Geant4-05-02)



◆ NIST-ESTAR

■ G4 Standard

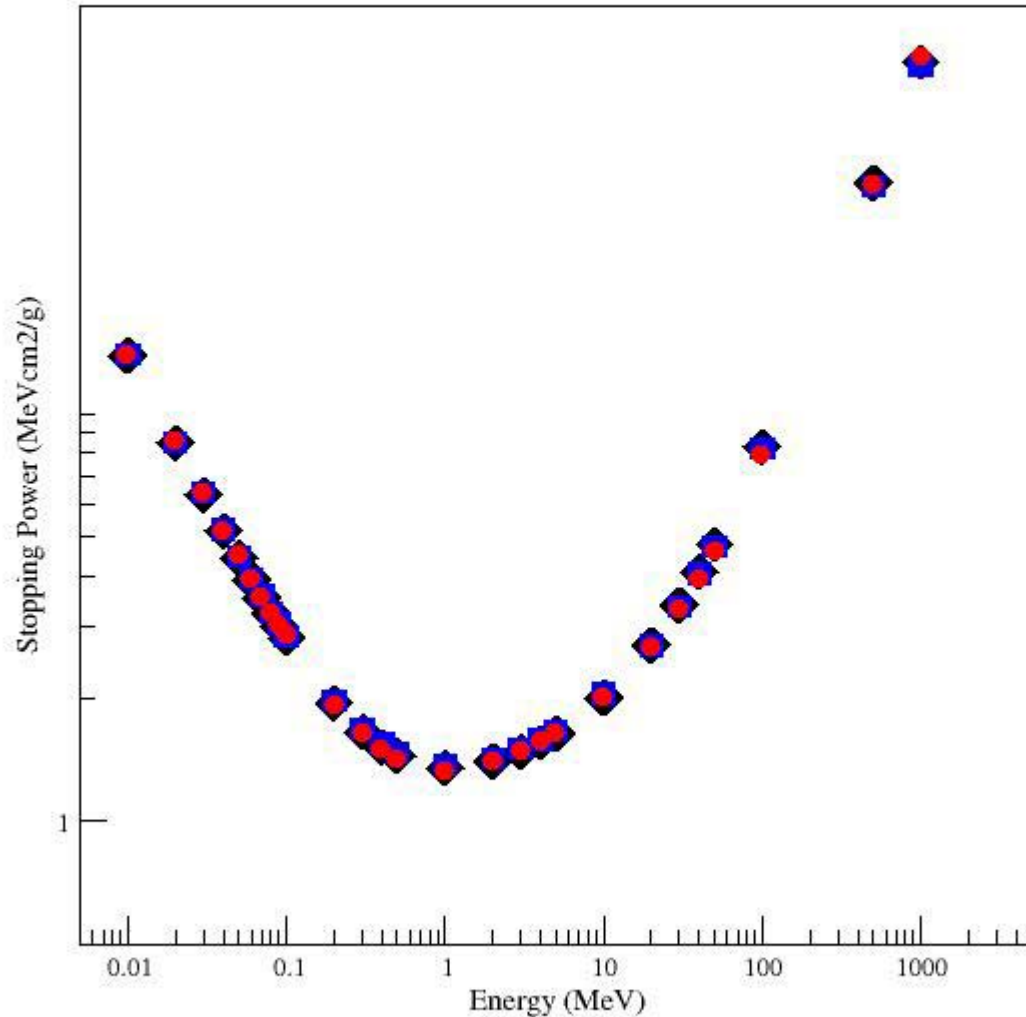
● G4 LowE



# Stopping Power - Fe

Electrons - Stopping Power - Iron

(Geant4-05-02)



◆ NIST-ESTAR

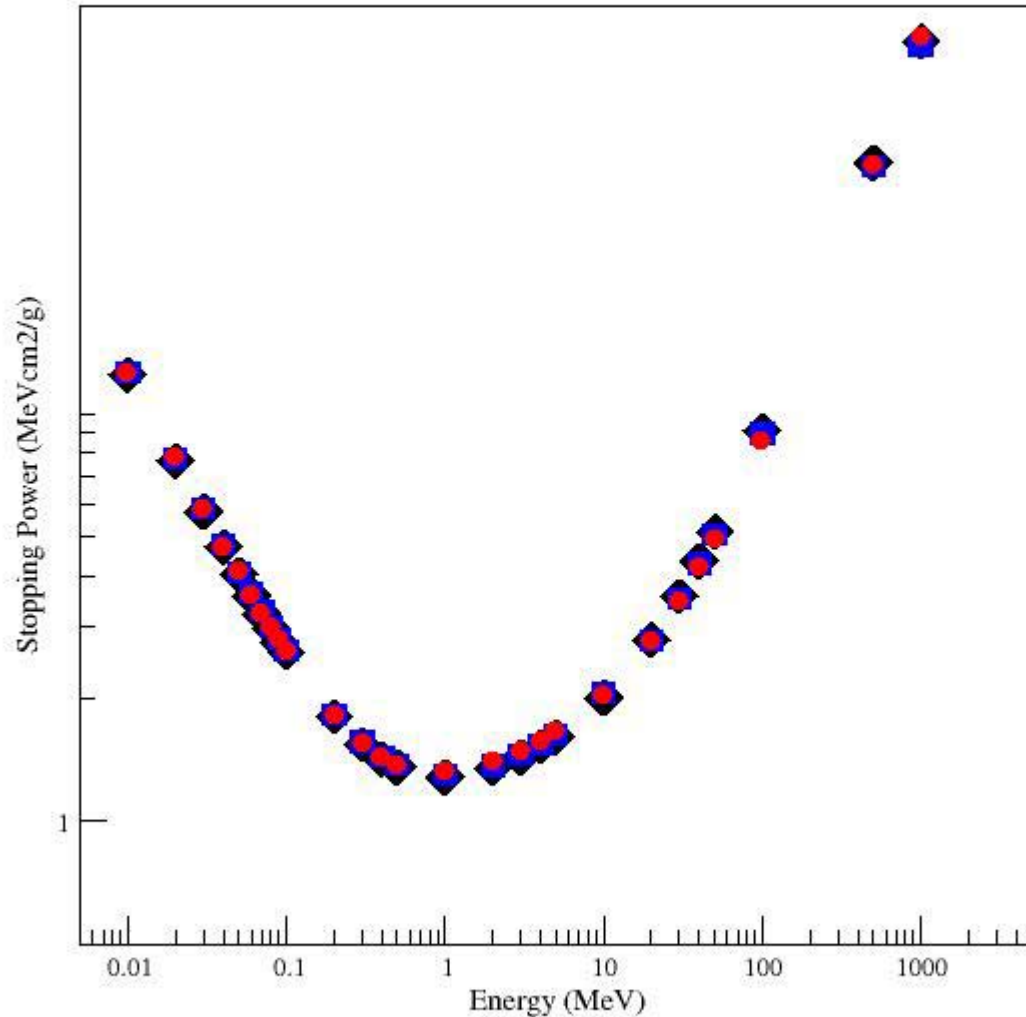
■ G4 Standard

● G4 LowE

# Stopping Power - Ge

Electrons - Stopping Power - Germanium

(Geant4-05-02)



◆ NIST-ESTAR

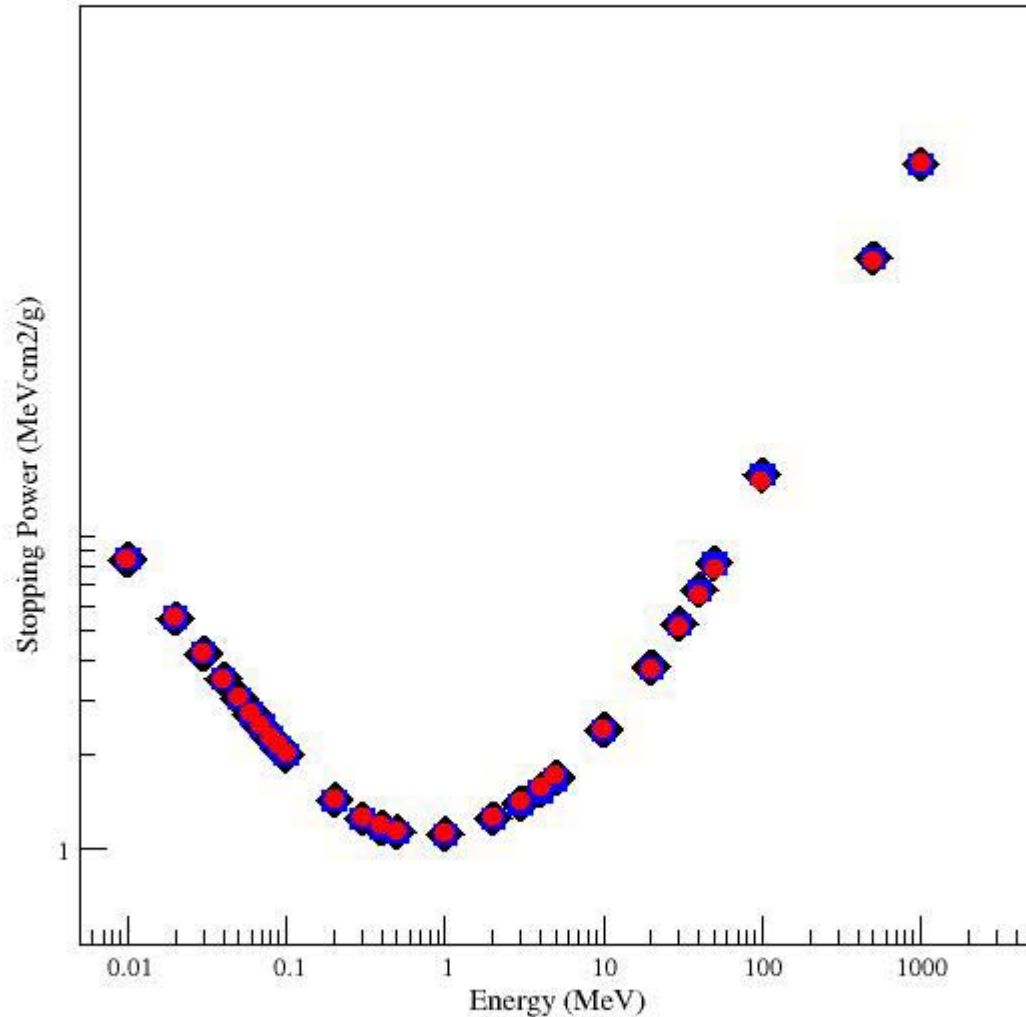
■ G4 Standard

● G4 LowE

# Stopping Power - Pb

Electrons - Stopping Power - Lead

(Geant4-05-02)



◆ NIST-ESTAR

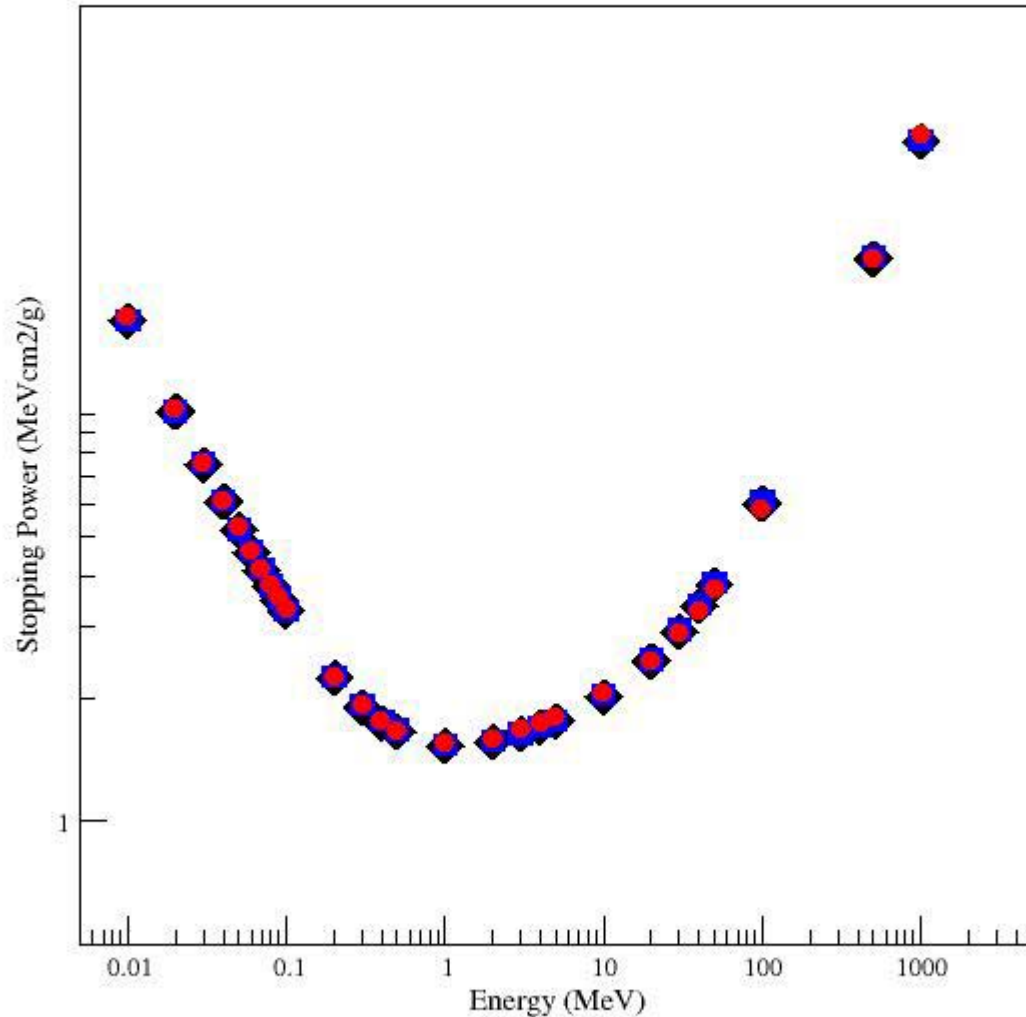
■ G4 Standard

● G4 LowE

# Stopping Power - Si

Electrons - Stopping Power - Silicon

(Geant4-05-02)



◆ NIST-ESTAR

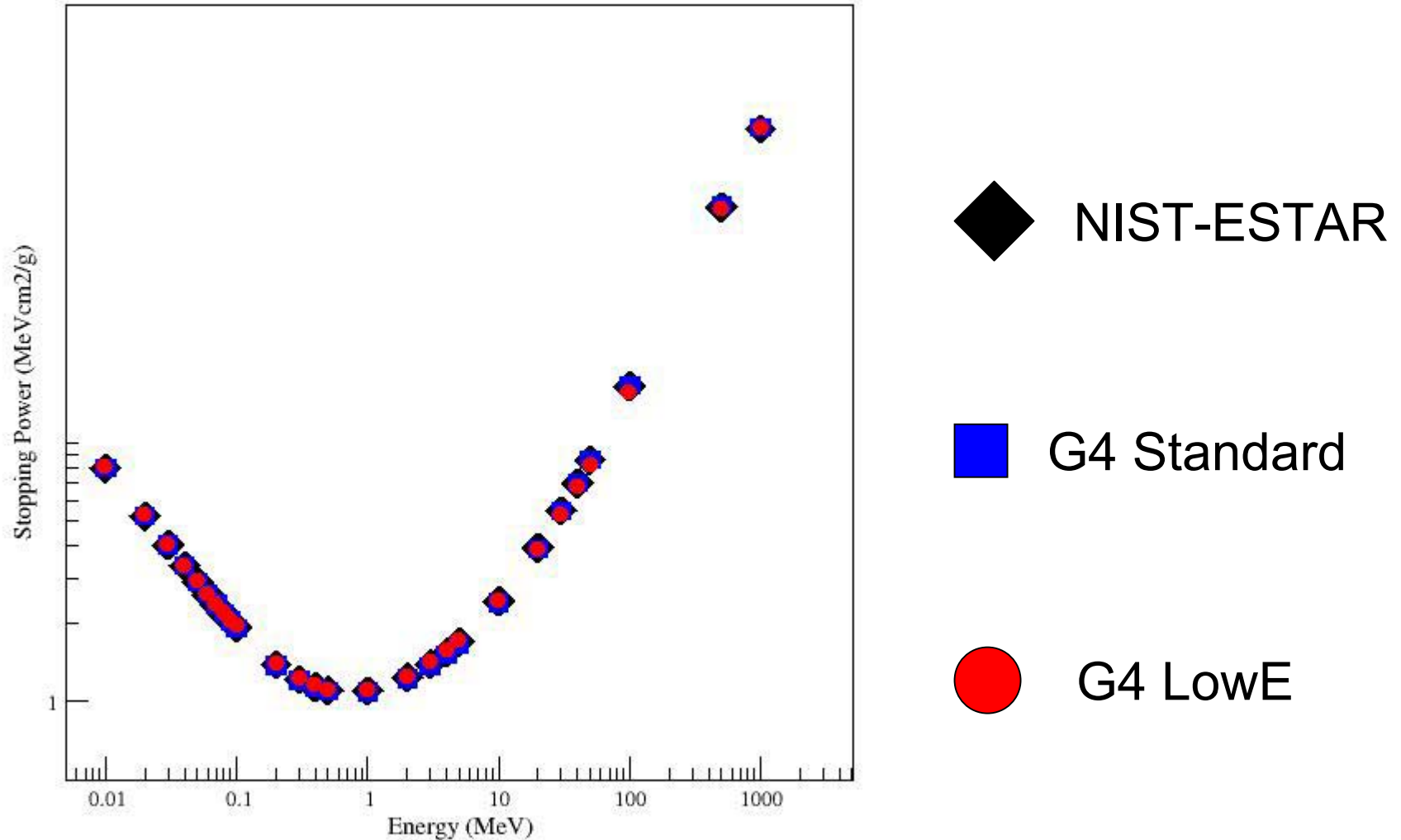
■ G4 Standard

● G4 LowE

# Stopping Power - U

Electrons - Stopping Power - Uranium

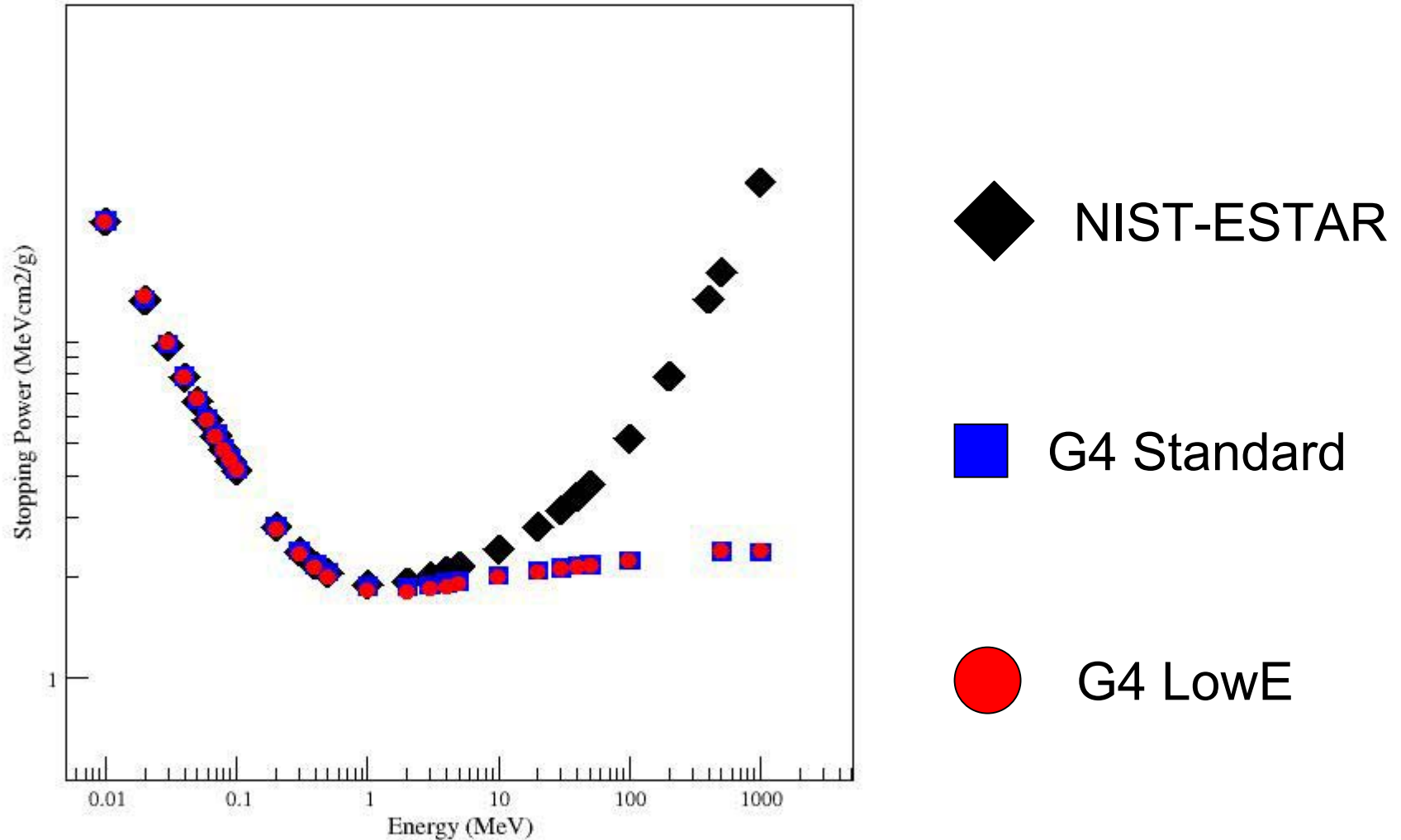
(Geant4-05-02)



# Stopping Power - Water

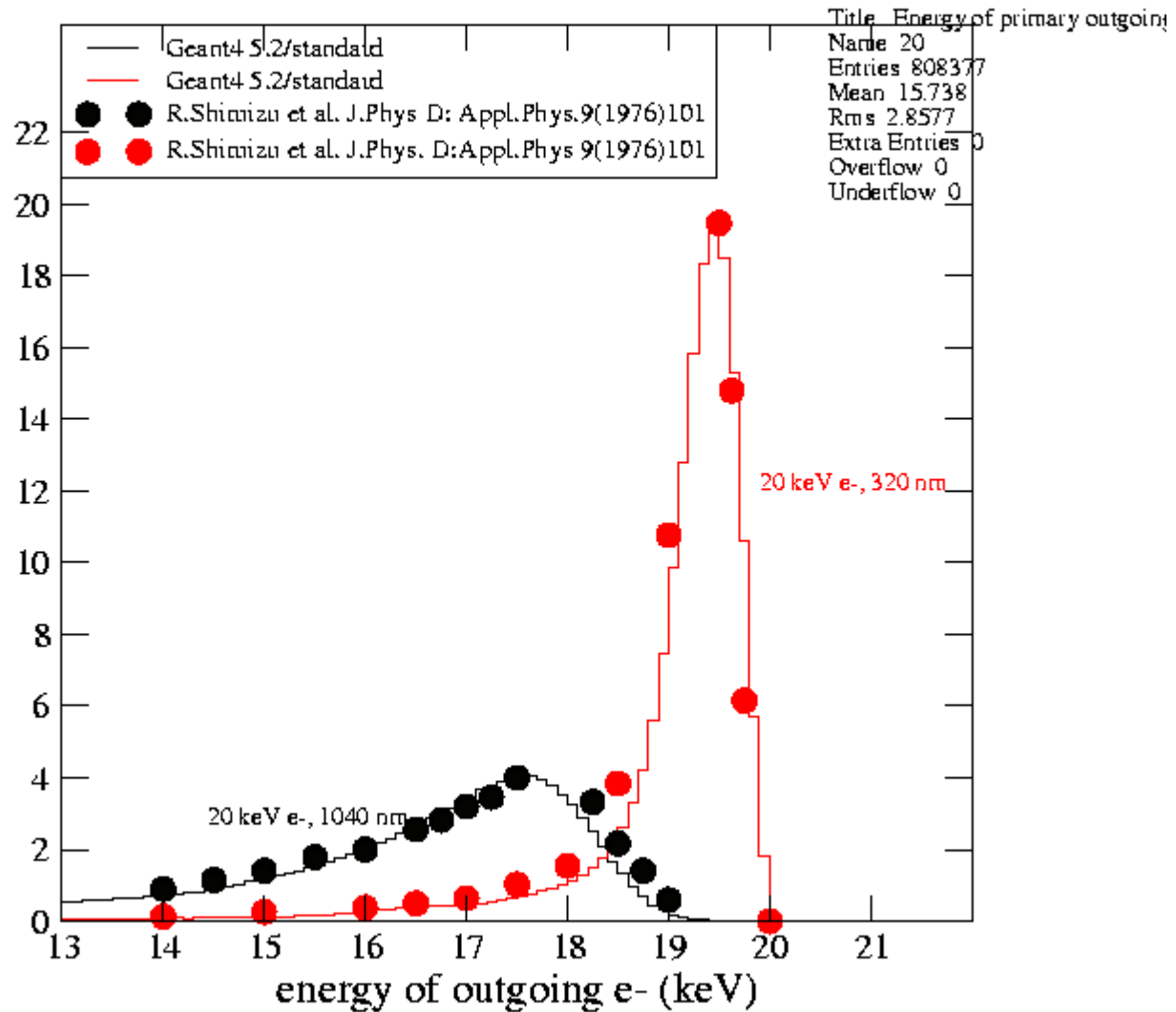
Electrons - Stopping Power - Water

(Geant4-05-02)



# ELECTRONS - TRANSMISSION

# Energy distributions of transmitted e- on Al



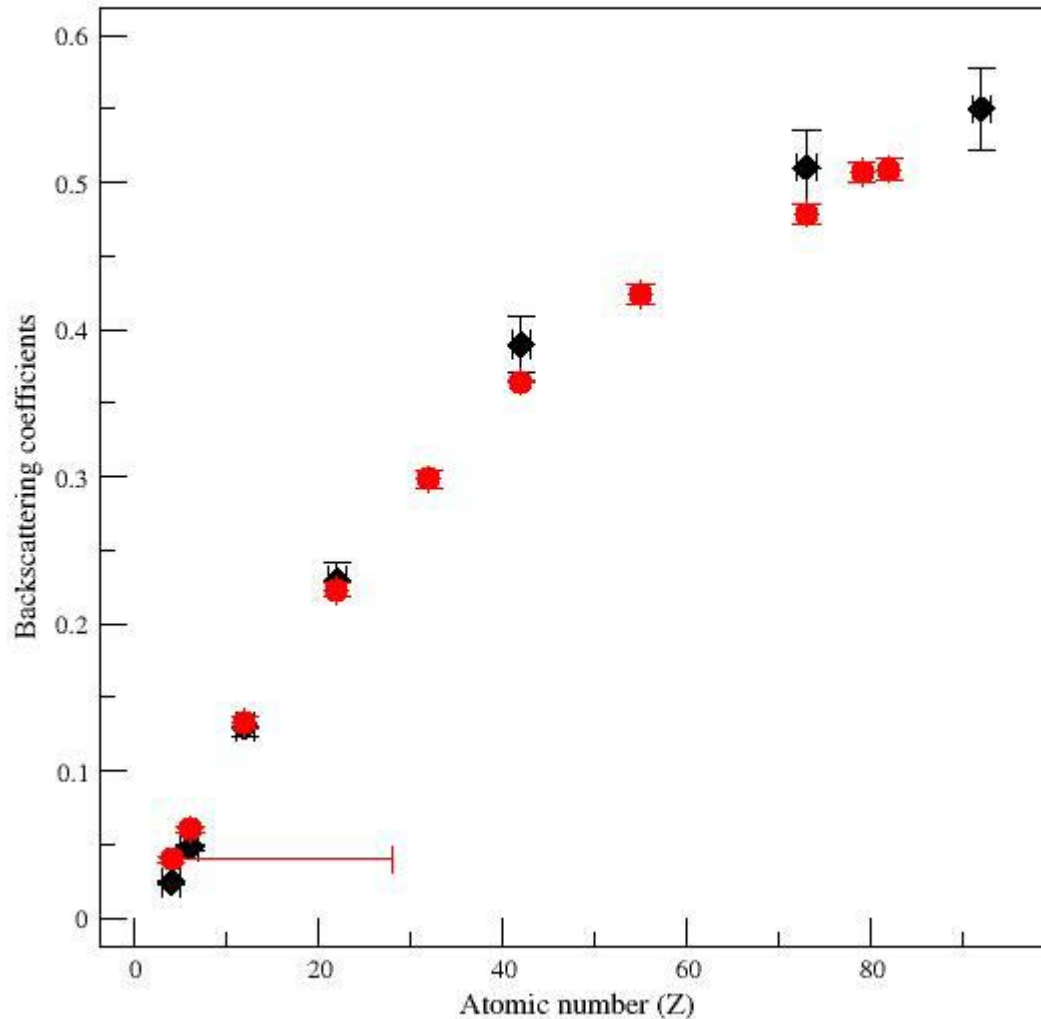


# ELECTRONS - BACKSCATTERING

# Backscattering coefficients – E=100keV

Electrons - Backscattering Coefficients - 100keV

(Geant4-05-02)



Angle of incidence (with respect to the normal to the sample surface)=0°



Lockwood et al. (1981)

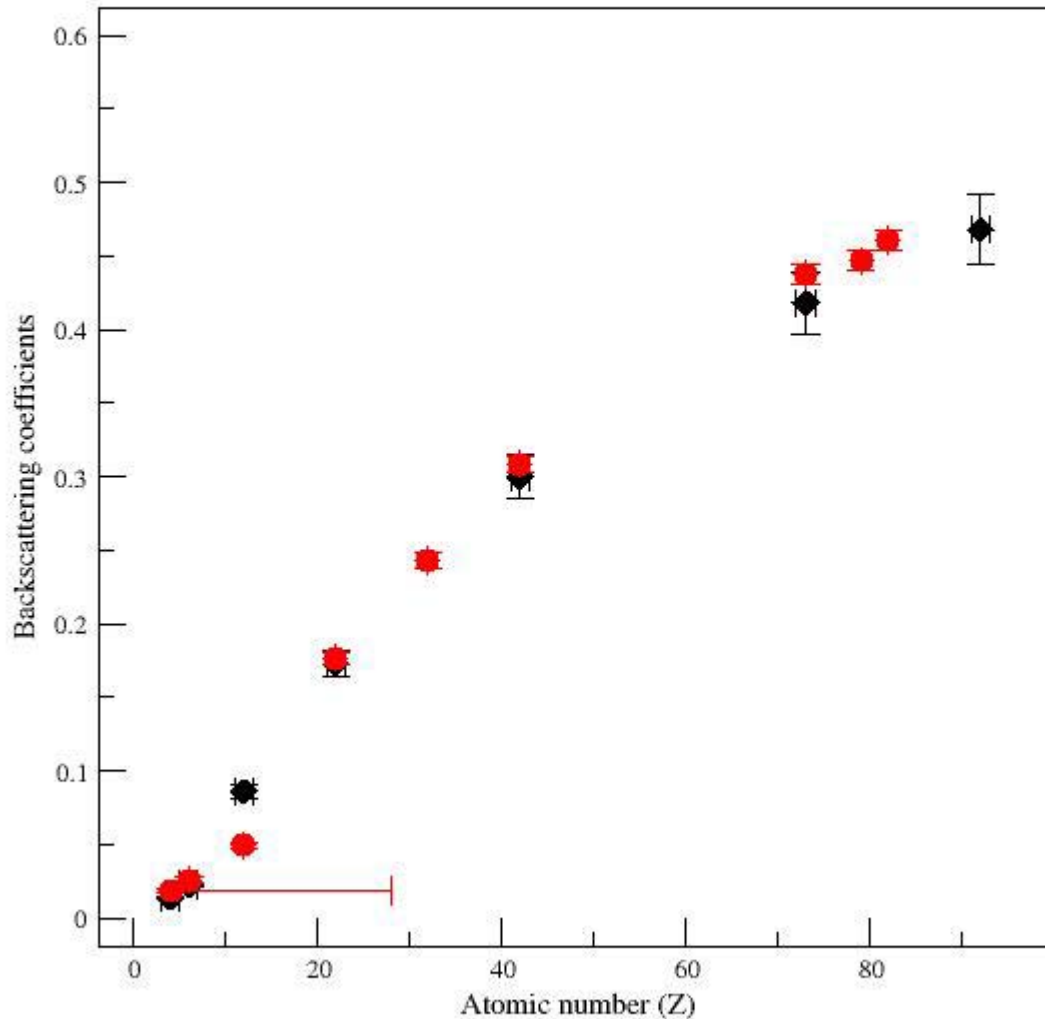


G4 LowE

# Backscattering coefficients – E=1MeV

Electrons - Backscattering Coefficients - 1MeV

(Geant4-05-02)



Angle of incidence (with respect to the normal to the sample surface)=0°



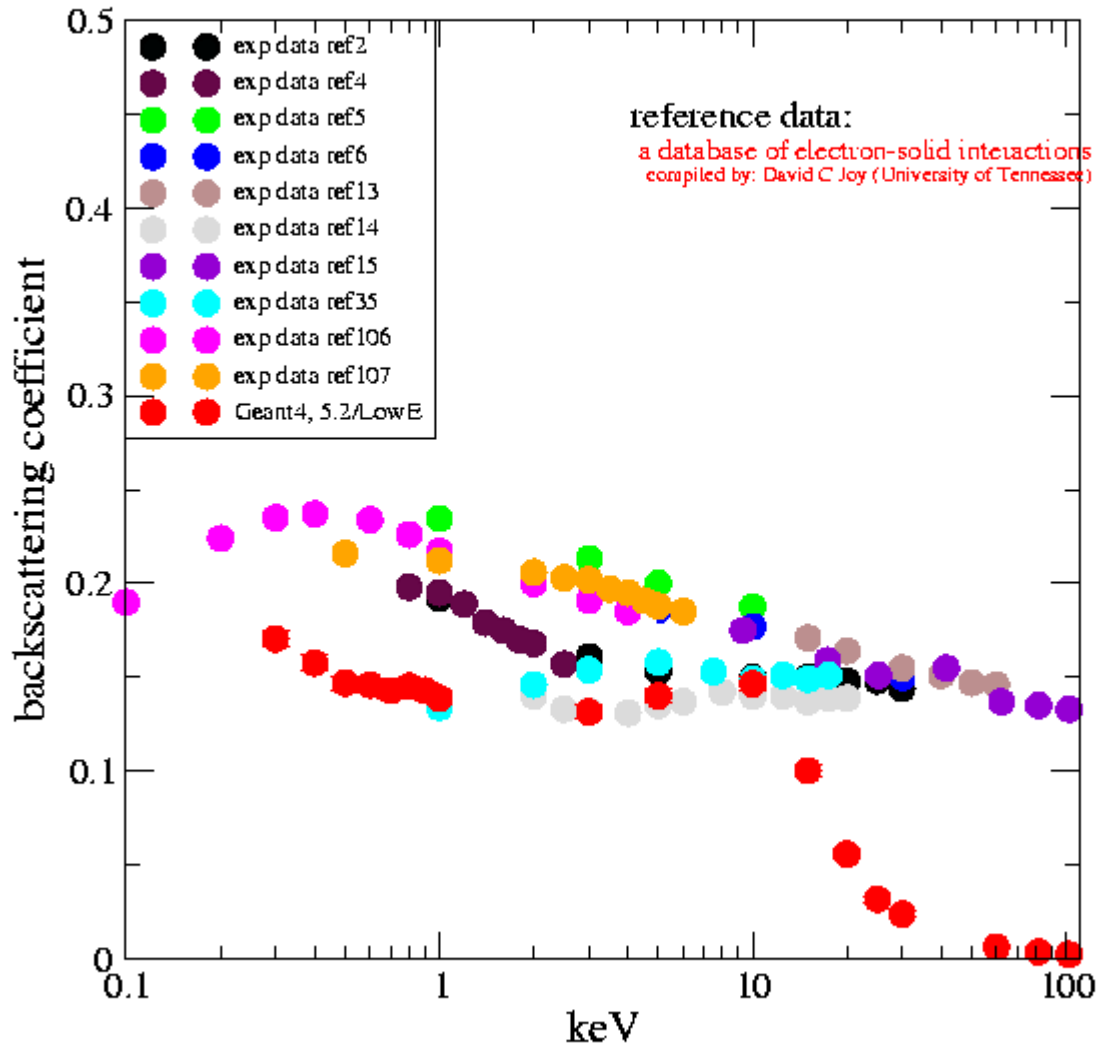
Lockwood et al. (1981)



G4 LowE

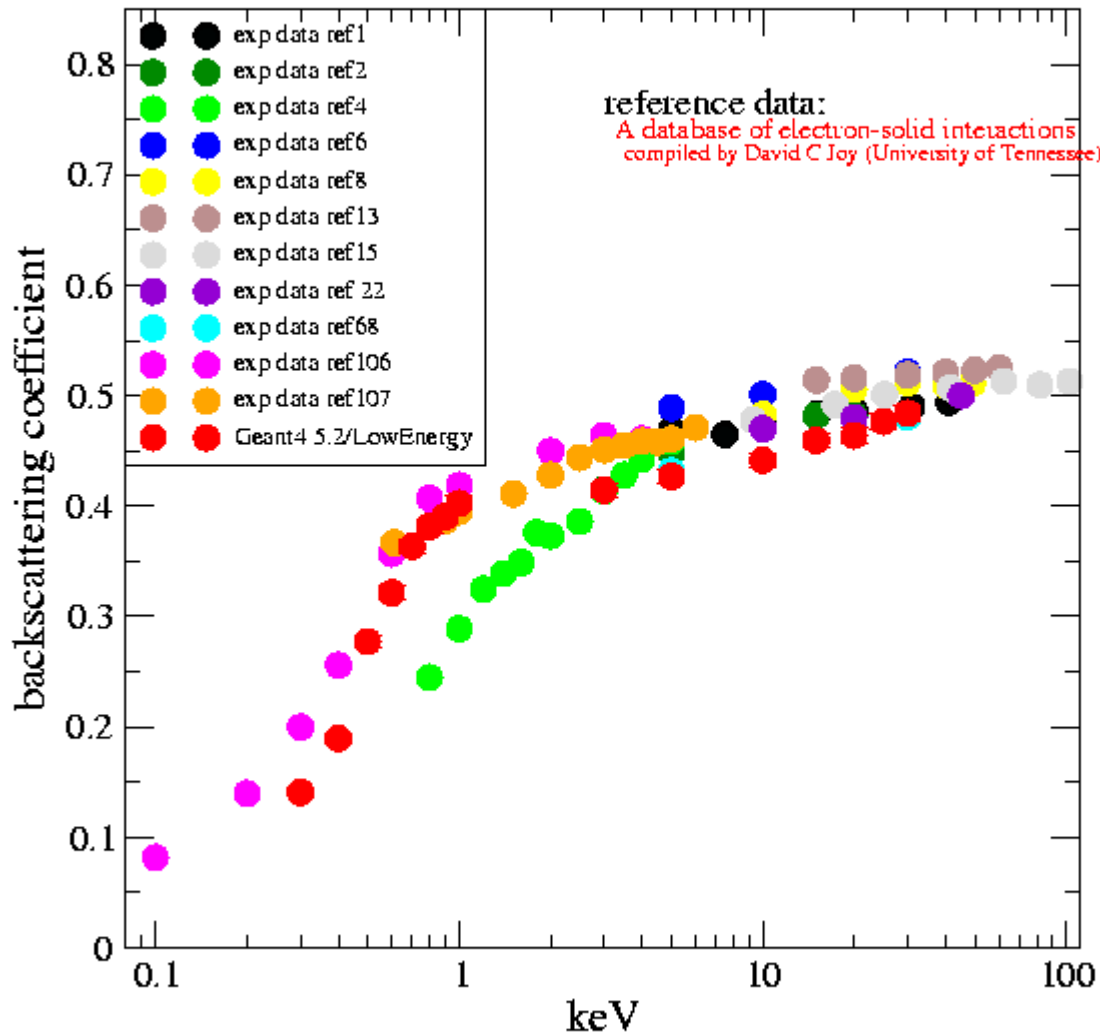
# Backscattering low energies - Al

backscattering for e-  
energy range : 0.1 keV -> 102 keV



# Backscattering low energies - Au

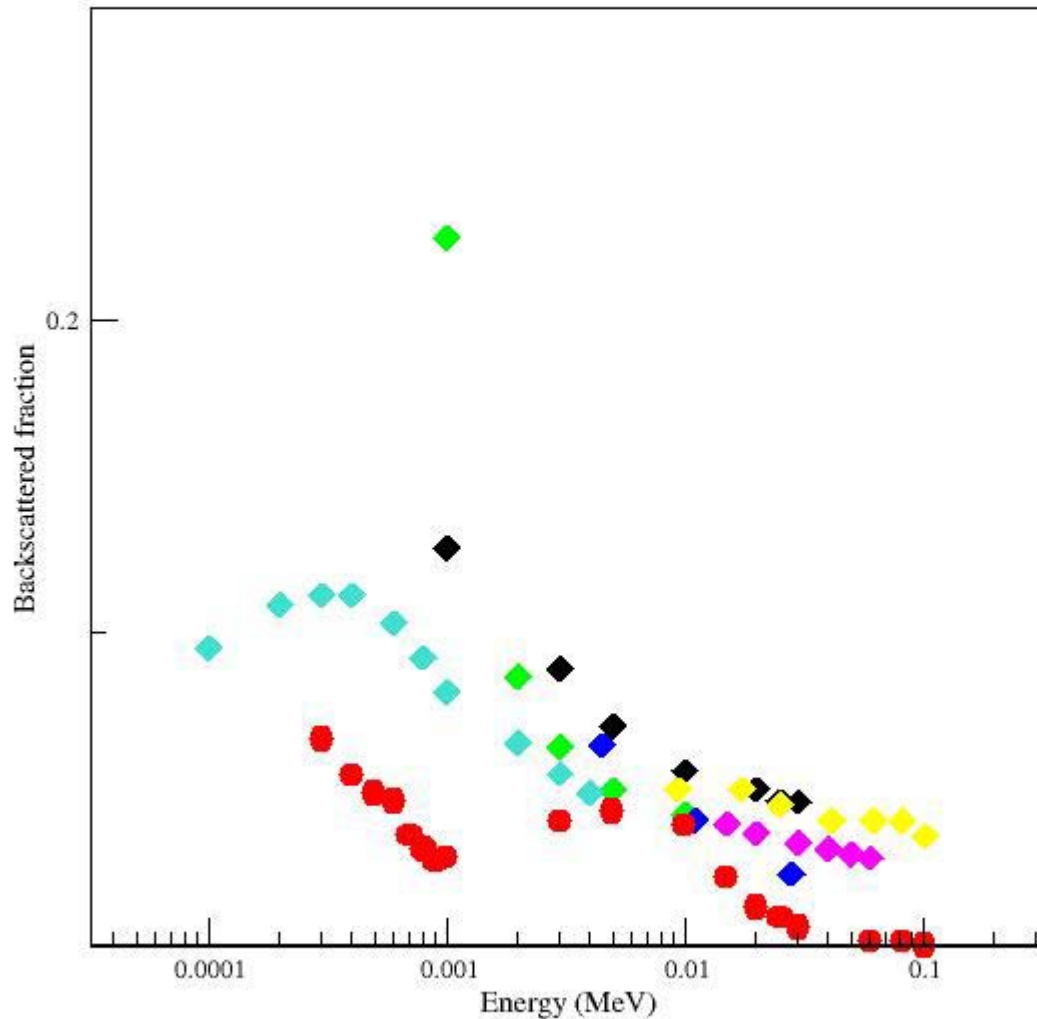
backscattering for e-  
e- energy range: 0.1 keV -> 102. keV



# Backscattering low energies - Be

Electrons - Backscattering - Beryllium

(Geant4-05-02 LowE)



Reimer, Tolcamp (1980)



Shimizu (1974)



Philibert, Weinryb (1964)



Neubert, Rogaschewski (1980)



Dresche (1970)



Bronstein, Fraiman (1969)

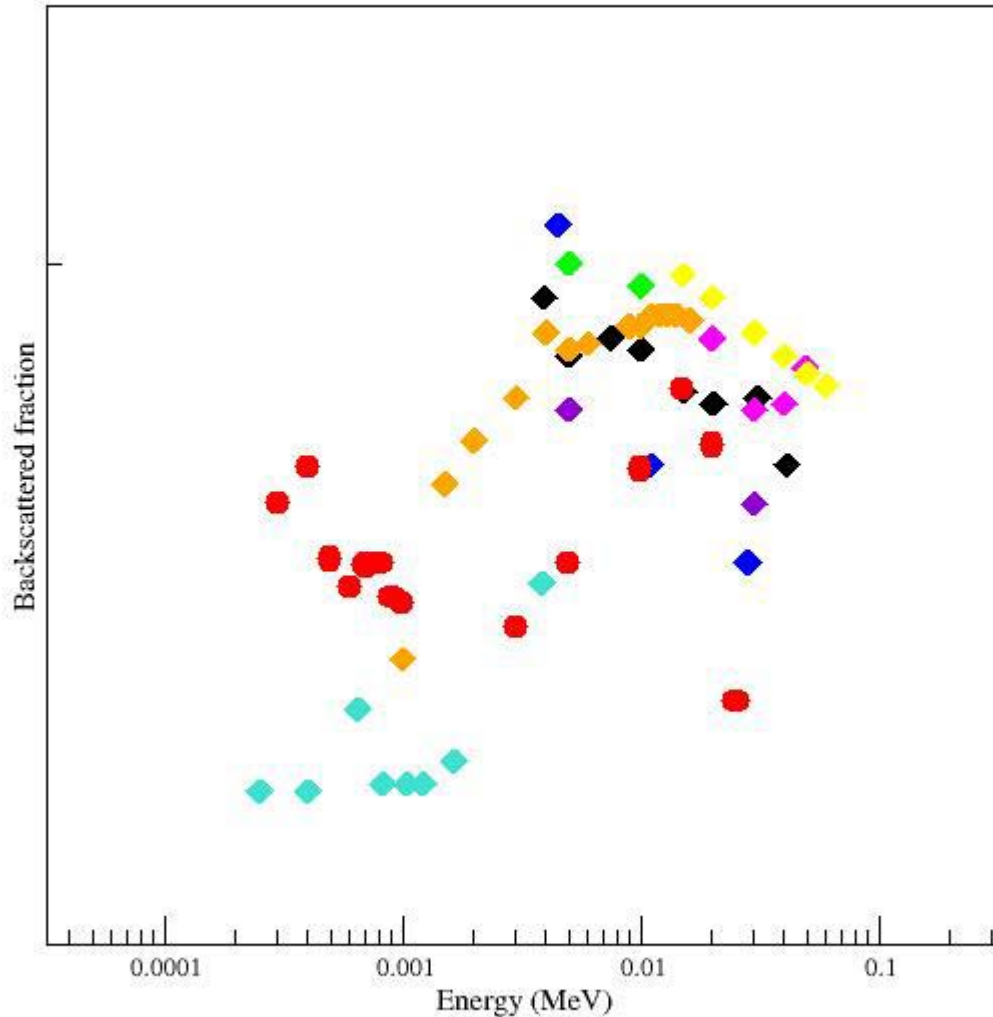


G4 LowE

# Backscattering low energies - Fe

Electrons - Backscattering - Iron

(Geant4-05-02 LowE)



◆ Hunger, Kuchler (1979)

◆ Bishop (1963)

◆ Philibert, Weinryb (1963)

◆ Heinrich (1966)

◆ Neubert, Rogaschewski (1980)

◆ Sternglass (1954)

◆ Palluel (1947)

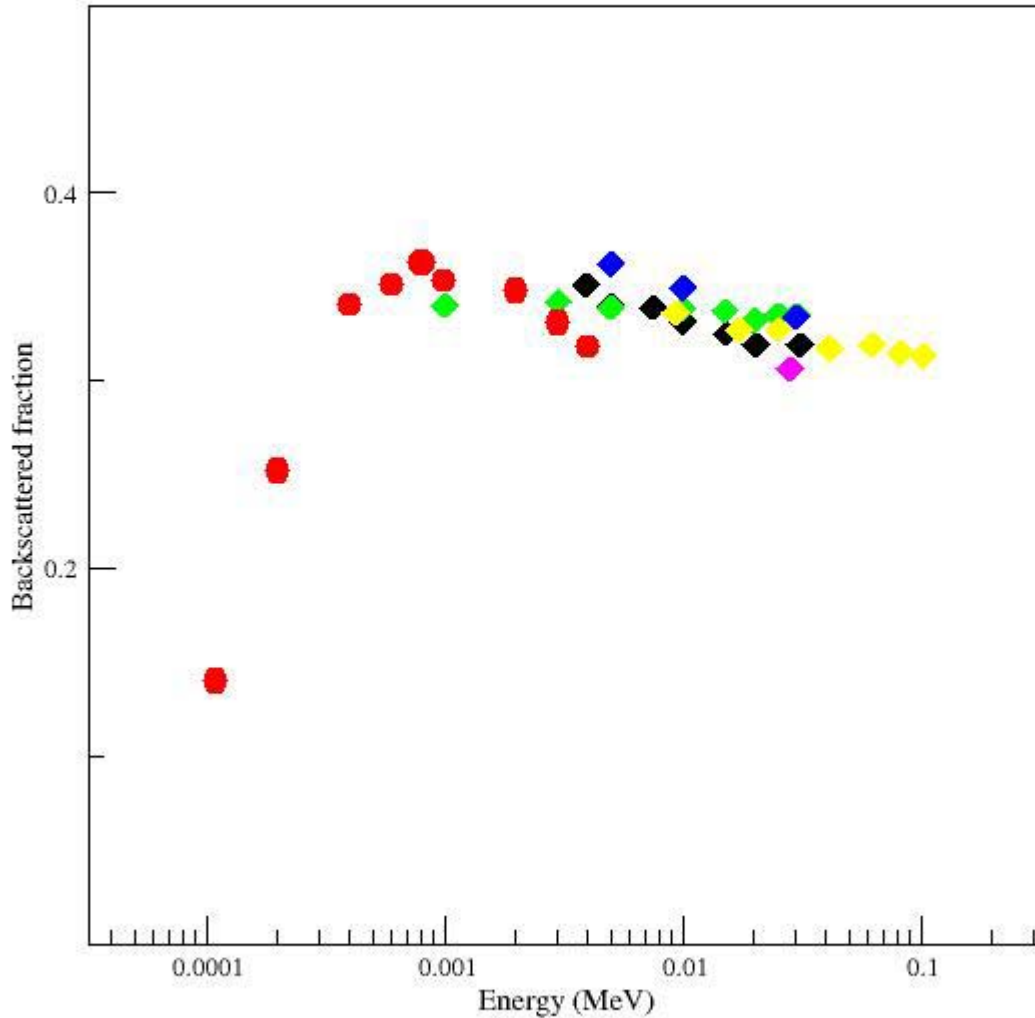
◆ Wittry (1966)

● G4 LowE

# Backscattering low energies - Ge

Electrons - Backscattering - Germanium

(Geant4-05-02 LowE)



Hunger, Kuchler (1979)



Reimer, Tolkamp (1980)



Bishop (1963)



Philibert, Weinryb (1963)



Drescher et al. (1970)



Bronstein, Fraiman (1969)



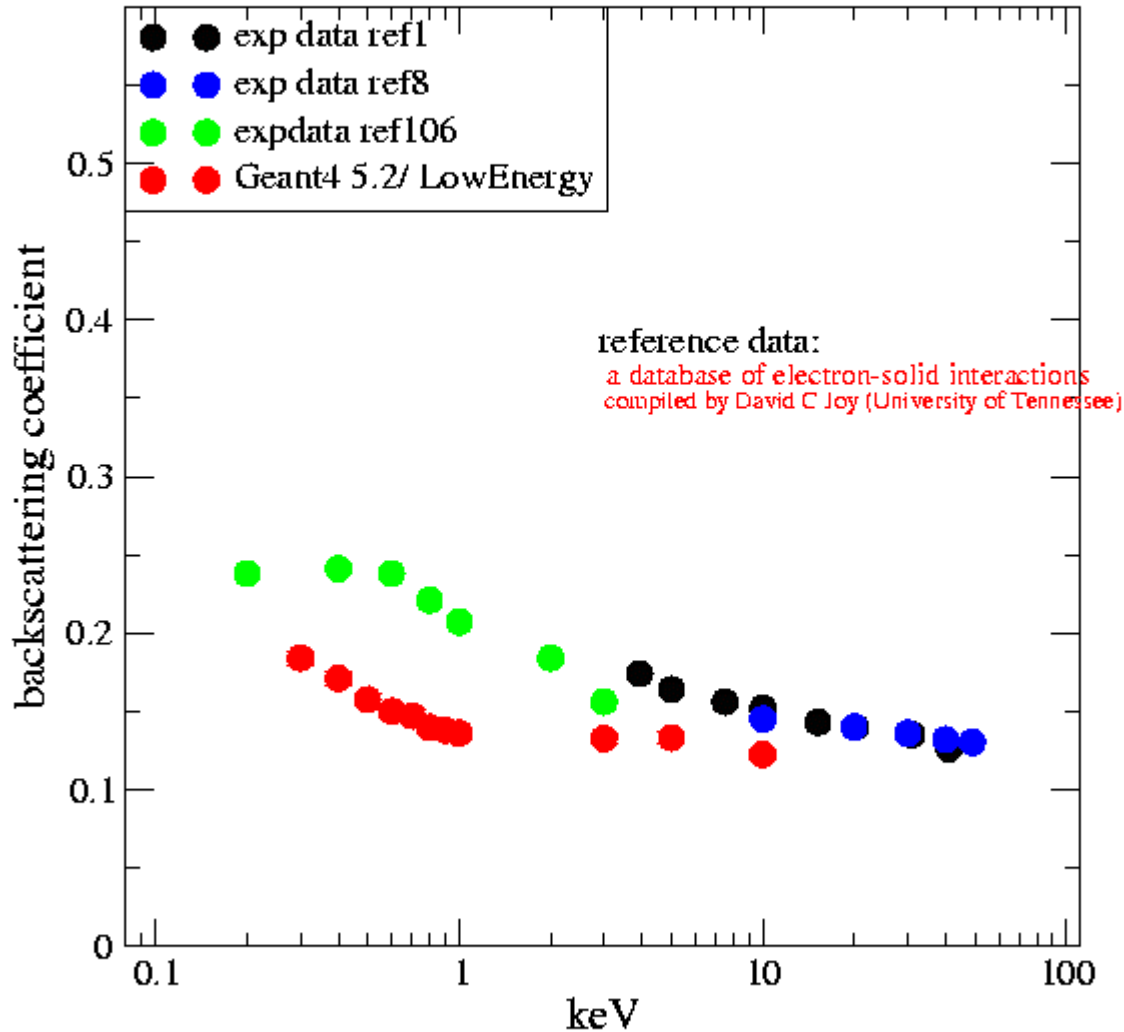
G4 LowE



# Backscattering low energies - Mg

e- backscattering on Mg

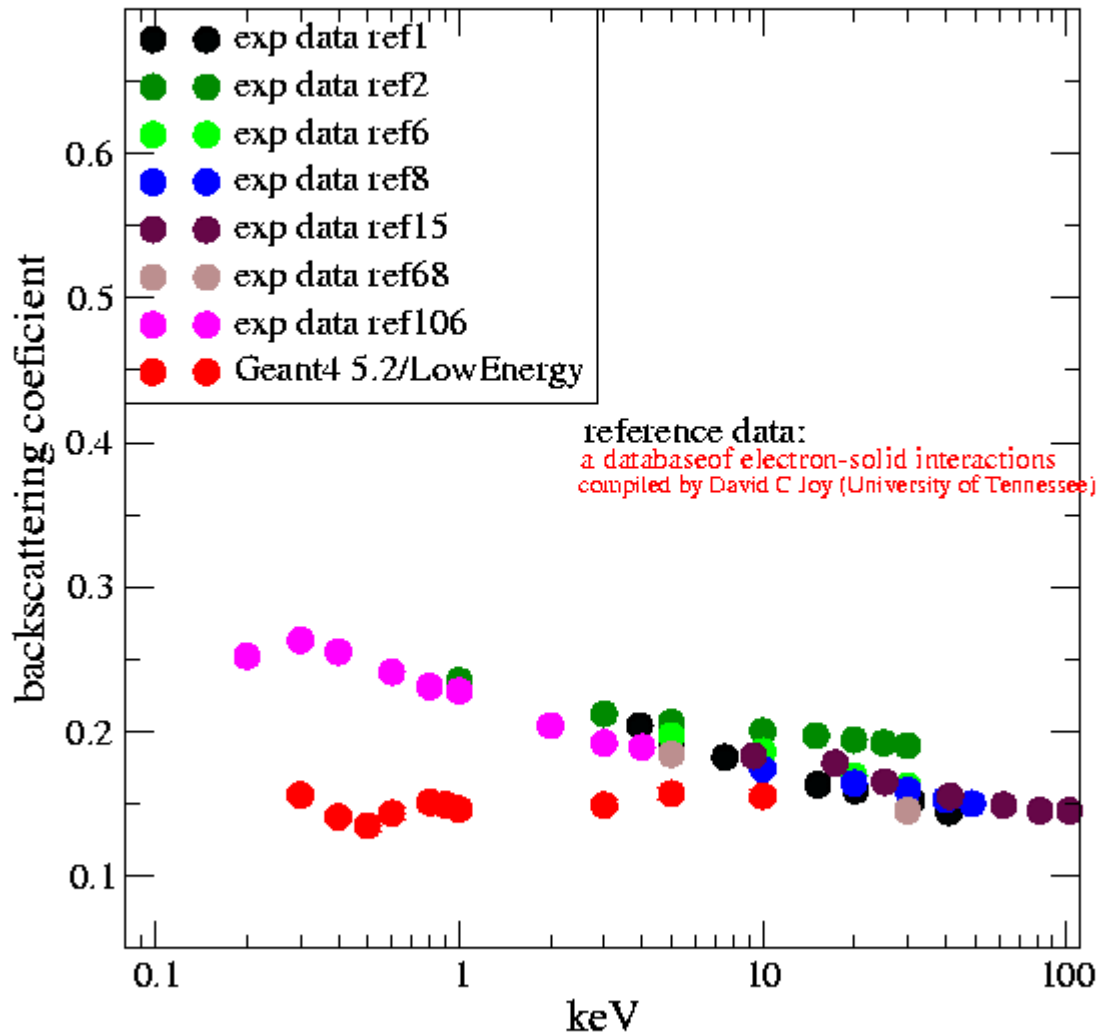
e- energy range: 0.1 keV -> 102 keV



# Backscattering low energies - Si

e- backscattering on Si

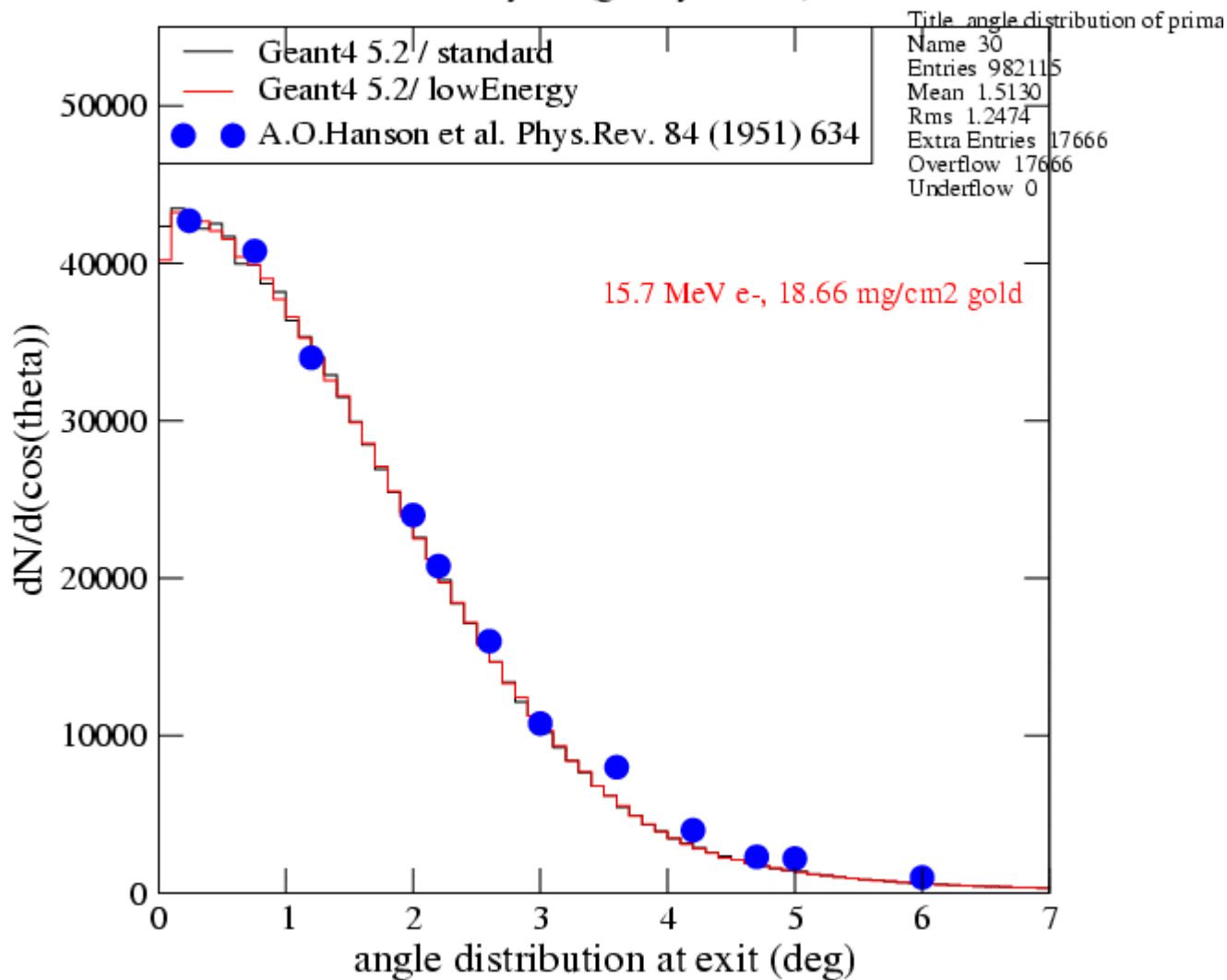
e- energy range: 0.1 keV -> 102. keV



# GALLERY – THIN LAYER 1 MULTIPLE SCATTERING

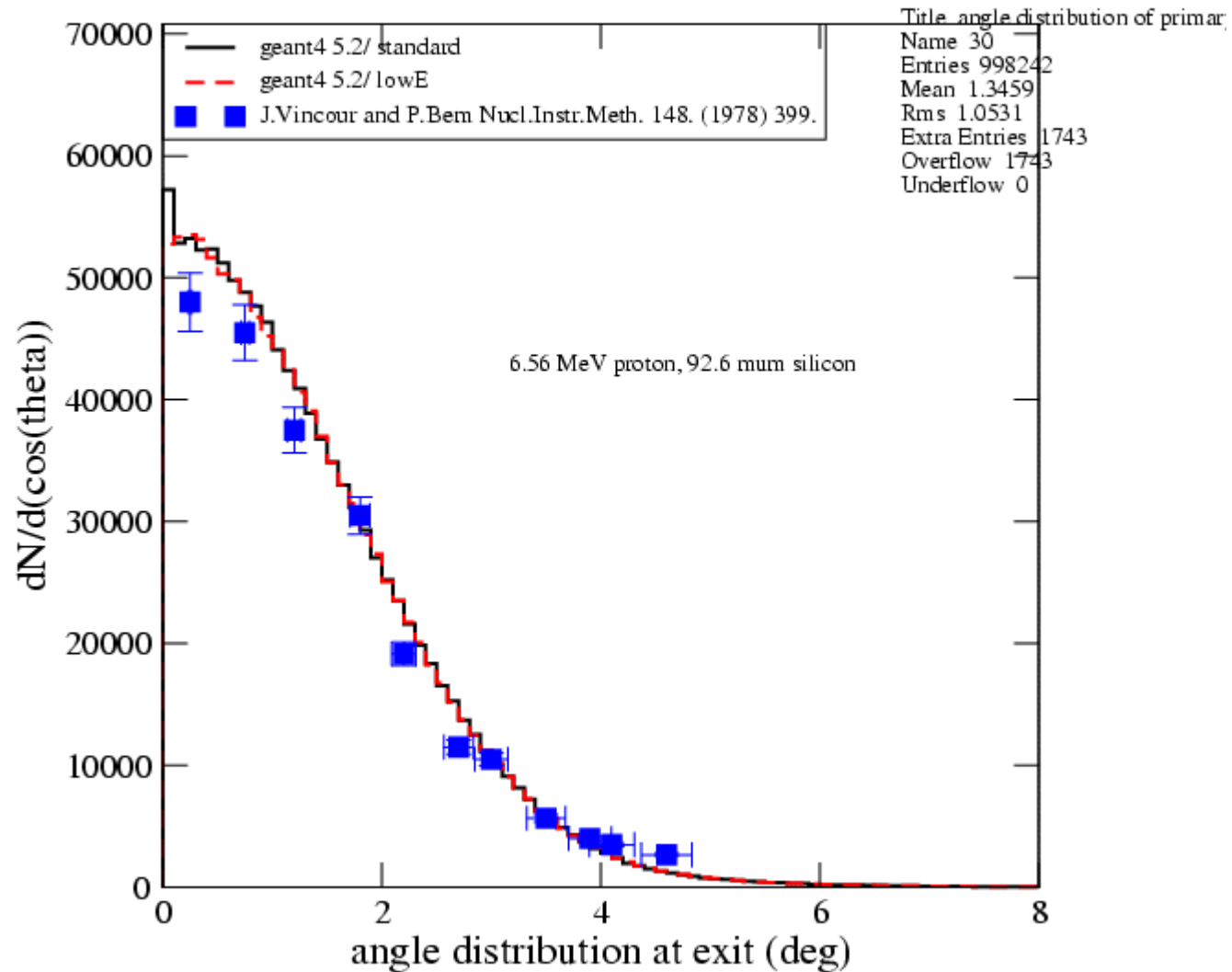
# multiple scattering test

Thin Layer 1 (gallery Geant4)



# multiple scattering test

Thin Layer 1 (gallery geant4)

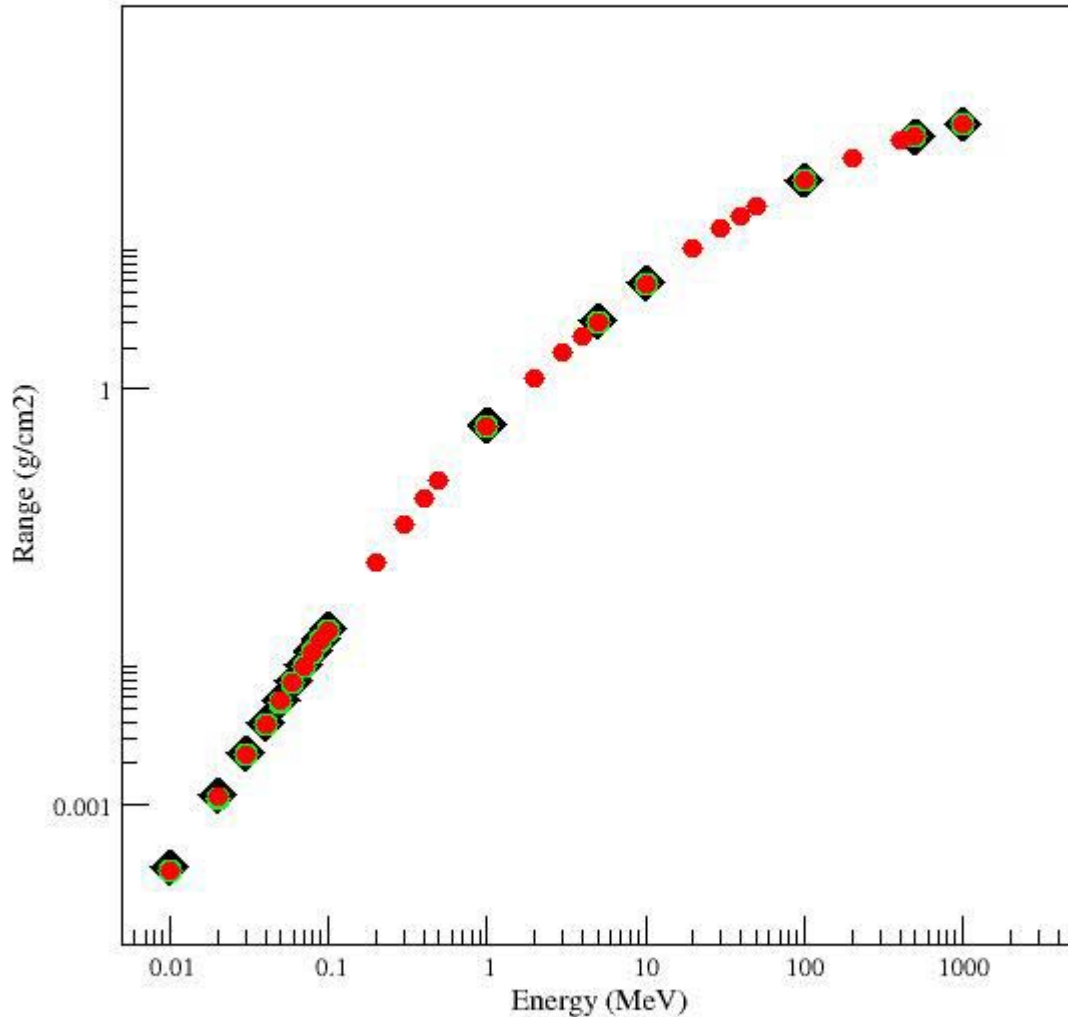


# REGRESSION TESTING

# CSDA Range – Al –G4LowE

Electrons - CSDA Range - Aluminium

Regression Testing - G4LowE



◆ NIST-ESTAR

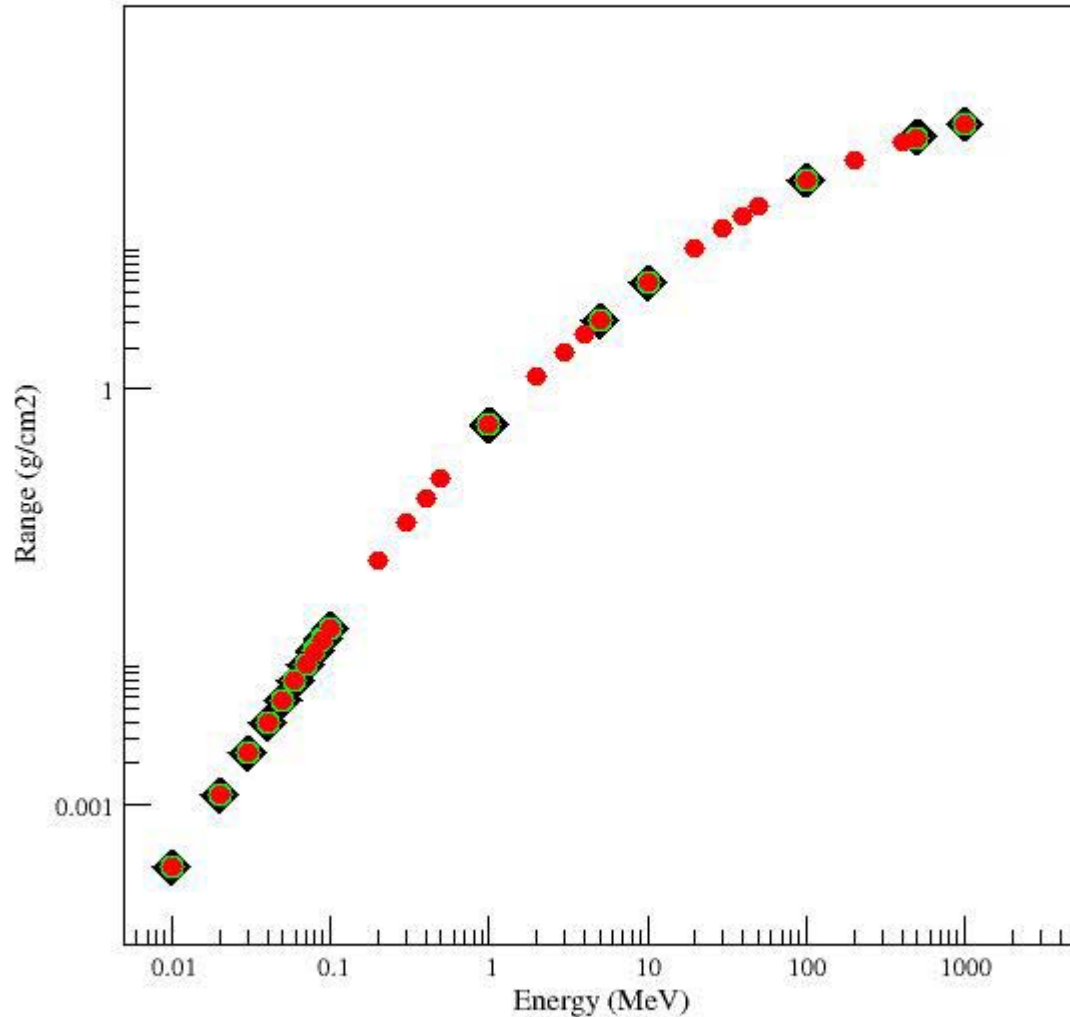
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Al – G4Standard

Electrons - CSDA Range - Aluminium

Regression Testing - G4Standard



◆ NIST-ESTAR

● Geant4-05-00

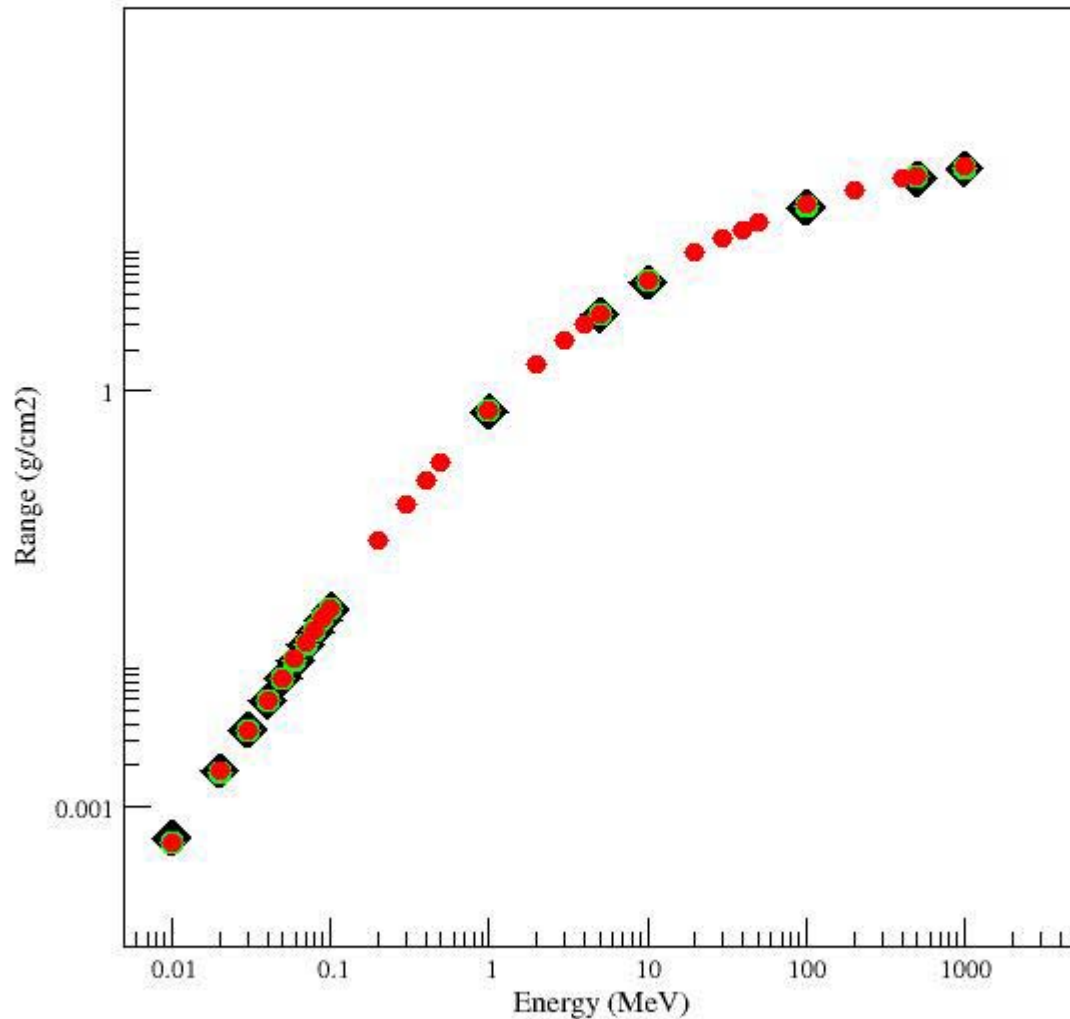
● Geant4-05-02



# CSDA Range – Cs –G4LowE

Electrons - CSDA Range - Cesium

Regression Testing - G4LowE



◆ NIST-ESTAR

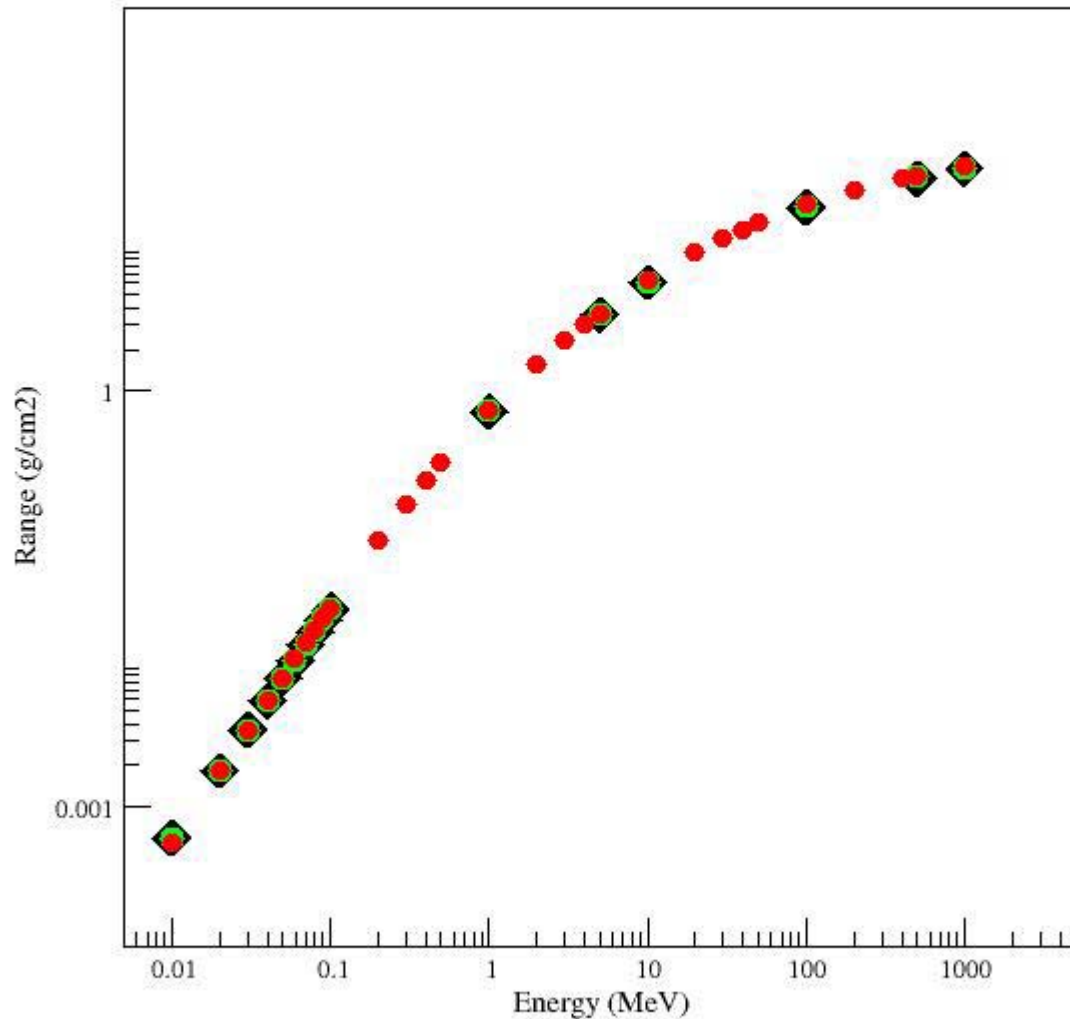
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Cs –G4Standard

Electrons - CSDA Range - Cesium

Regression Testing - G4Standard



◆ NIST-ESTAR

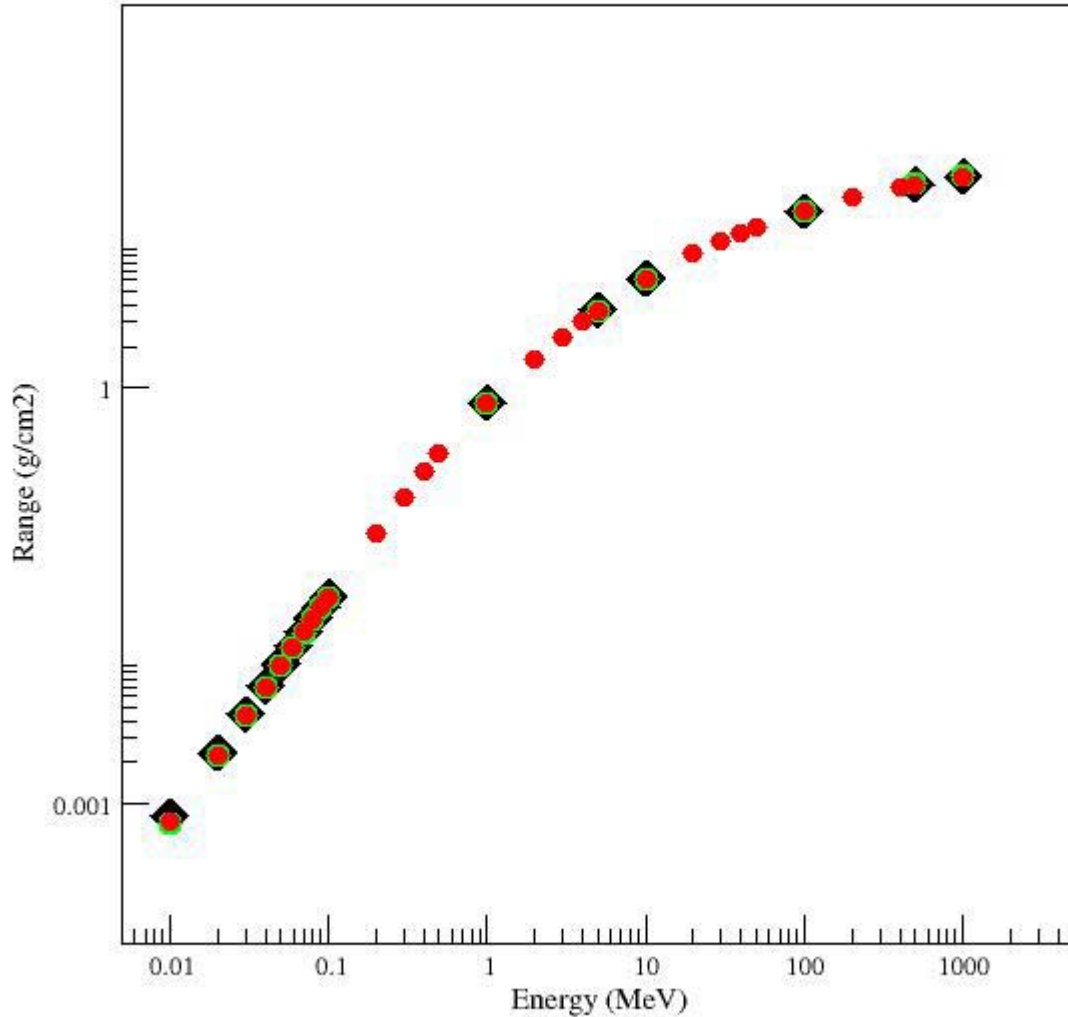
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Pb –G4LowE

Electrons - CSDA Range - Lead

Regression Testing - G4LowE



◆ NIST-ESTAR

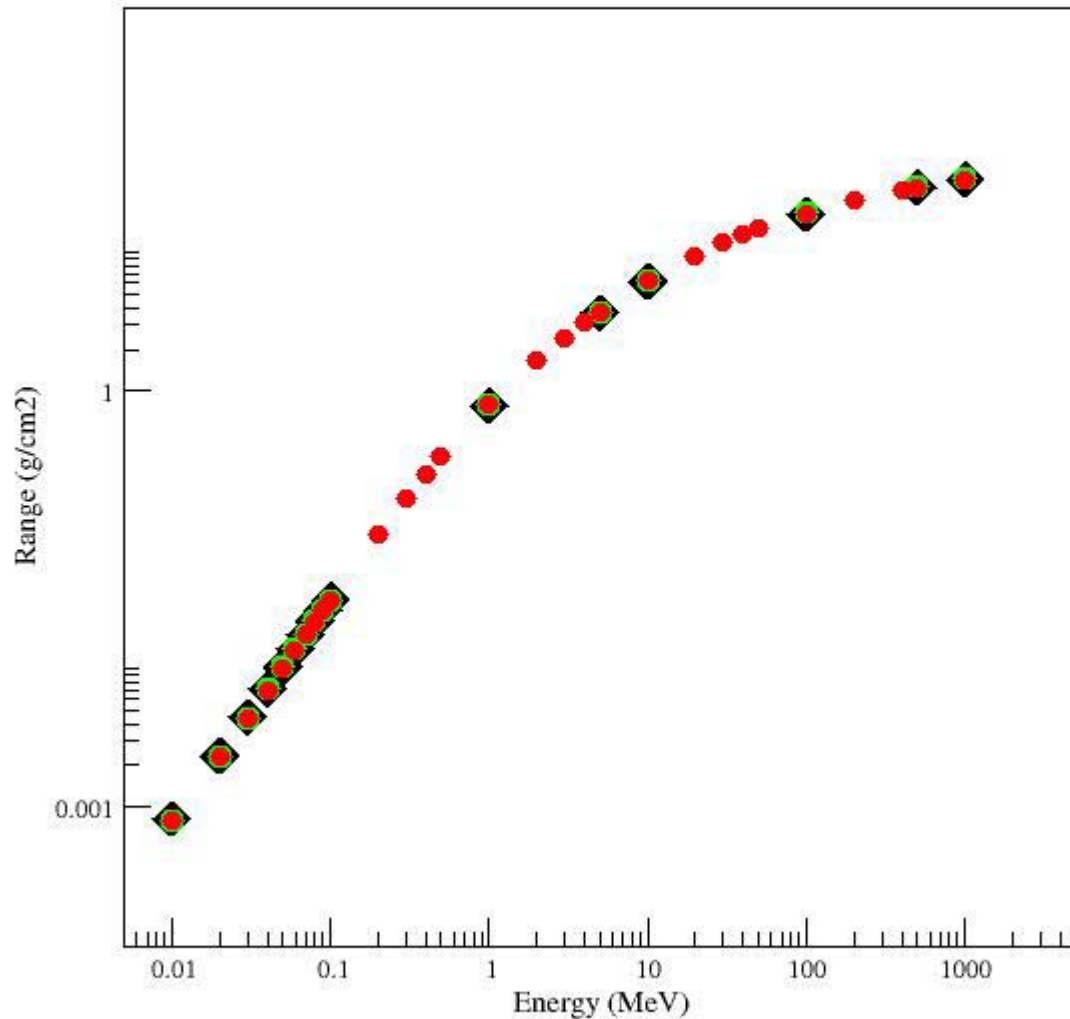
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Pb –G4Standard

Electrons - CSDA Range - Lead

Regression Testing - G4Standard



◆ NIST-ESTAR

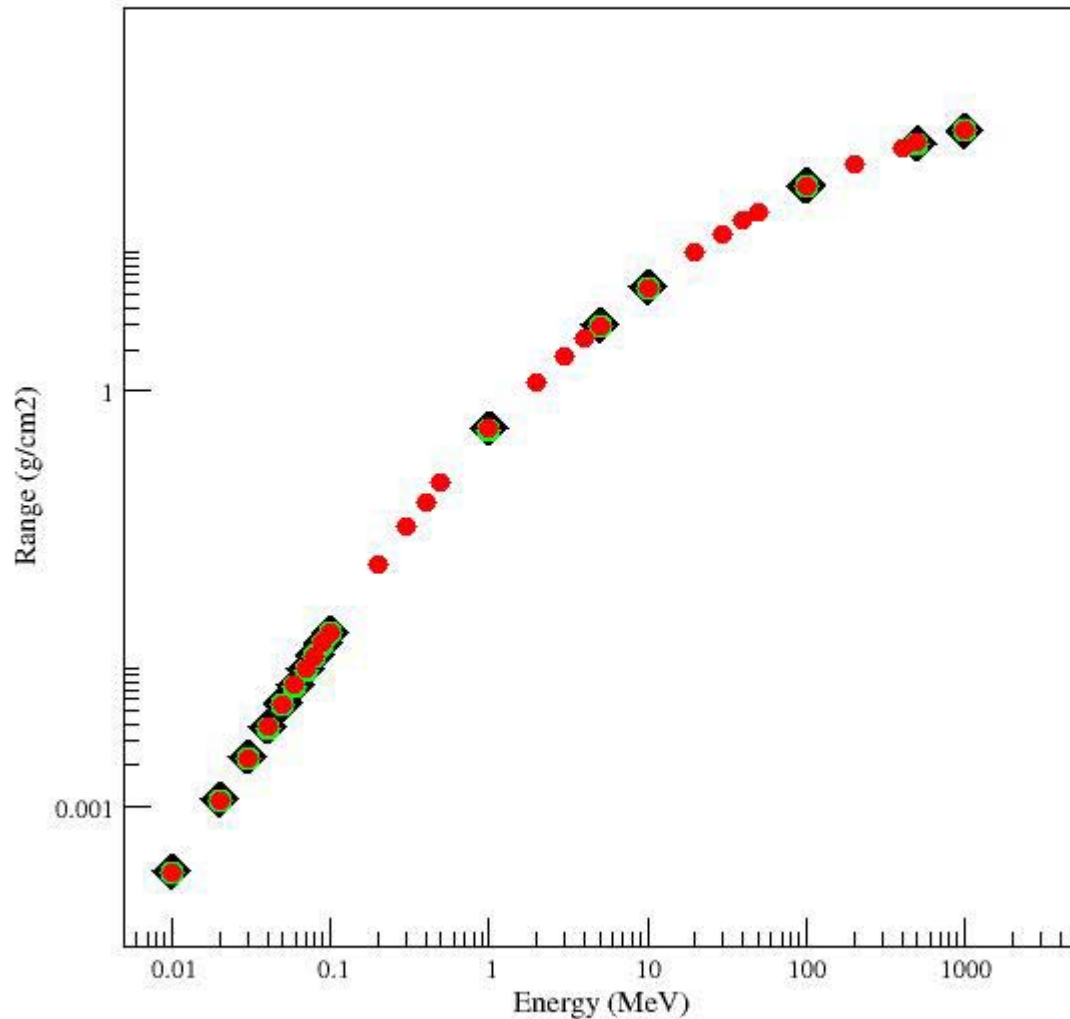
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Si –G4LowE

Electrons - CSDA Range - Silicon

Regression Testing - G4LowE



◆ NIST-ESTAR

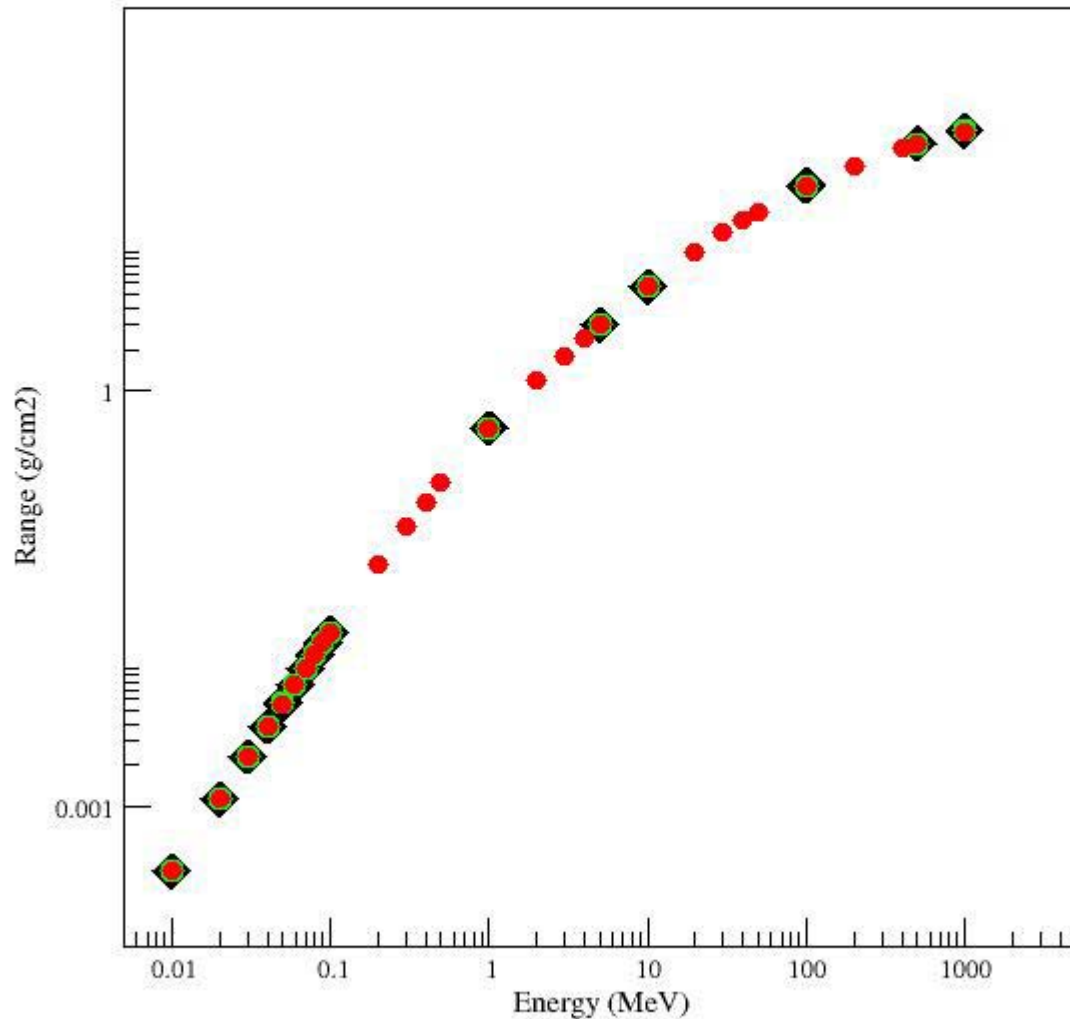
● Geant4-05-00

● Geant4-05-02

# CSDA Range – Si –G4Standard

Electrons - CSDA Range - Silicon

Regression Testing - G4Standard



◆ NIST-ESTAR

● Geant4-05-00

● Geant4-05-02