

Latest electron multiple scattering results  
at  
13 and 20 MeV

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October 25, 2012

# electronScattering2 example

(examples/extended/medical/)

Main svn tag: **geant4-09-05-ref-09**

Additional tags with fixes:

Standard: **emstand-V09-05-53**

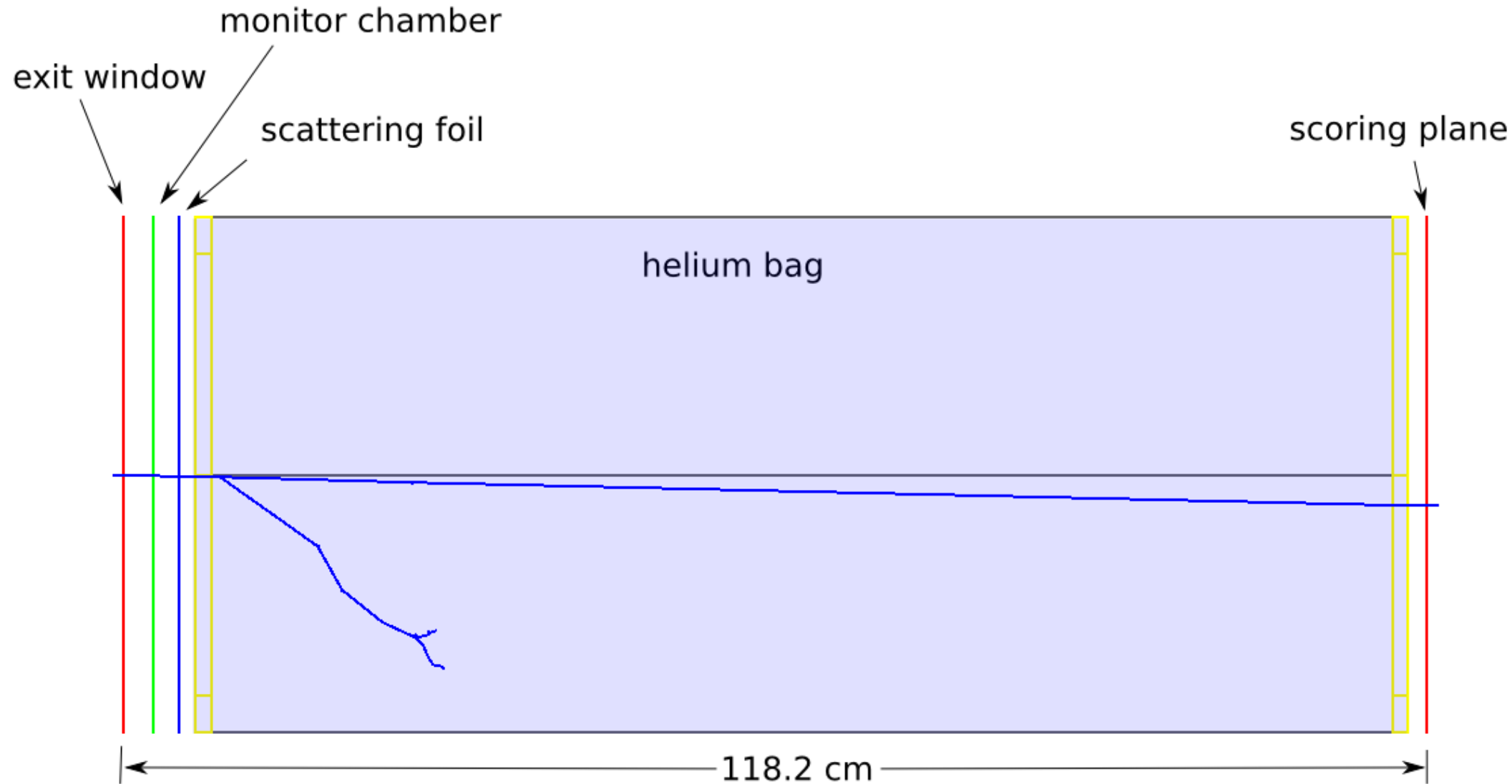
Utils: **emutils-V09-05-43**

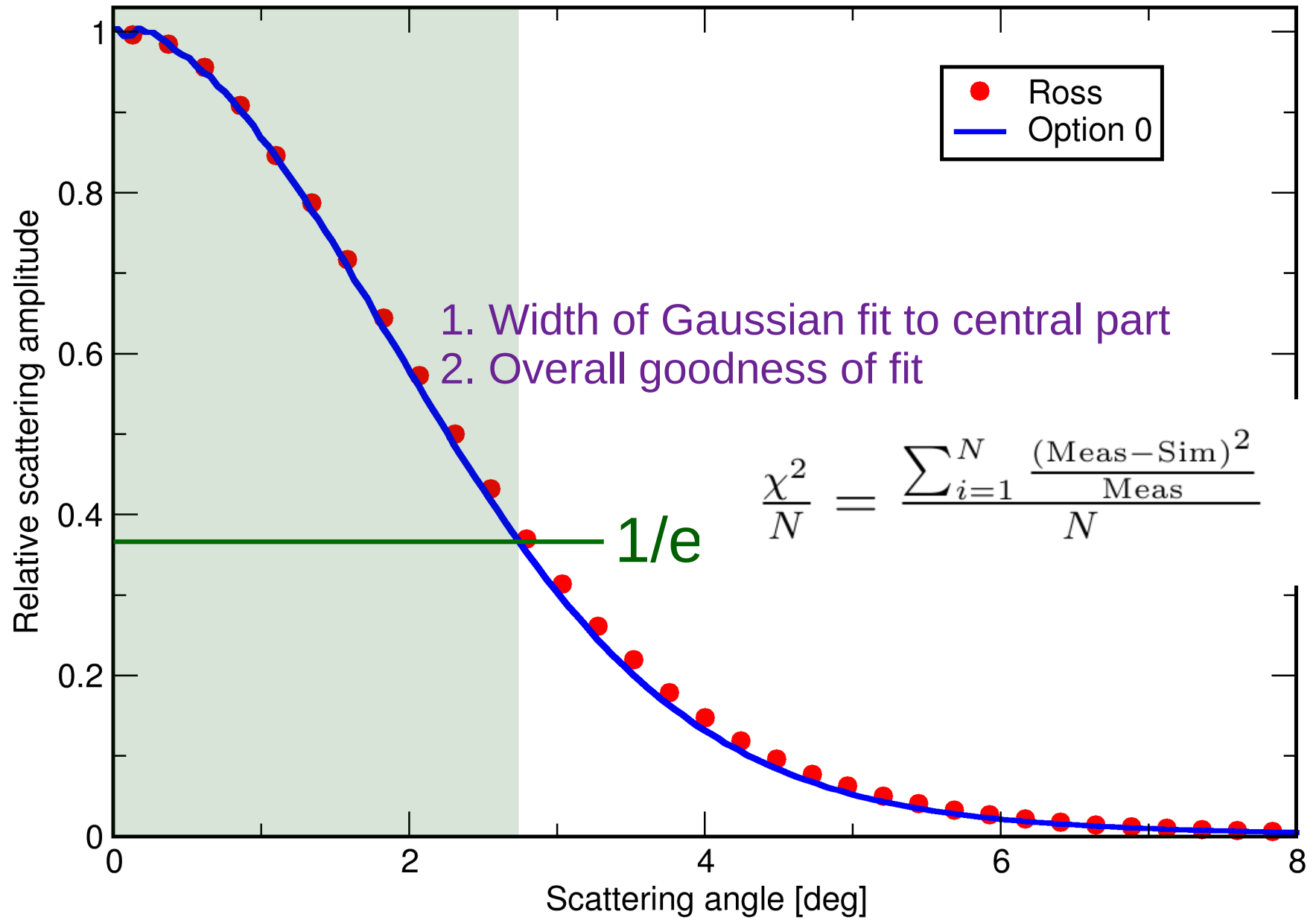
Physics lists from example

Modified G4EmStandard\_option3 to use Urban93, 95, or 96

# Experiment: Ross et al., Med. Phys. 35, 4121 (2008)

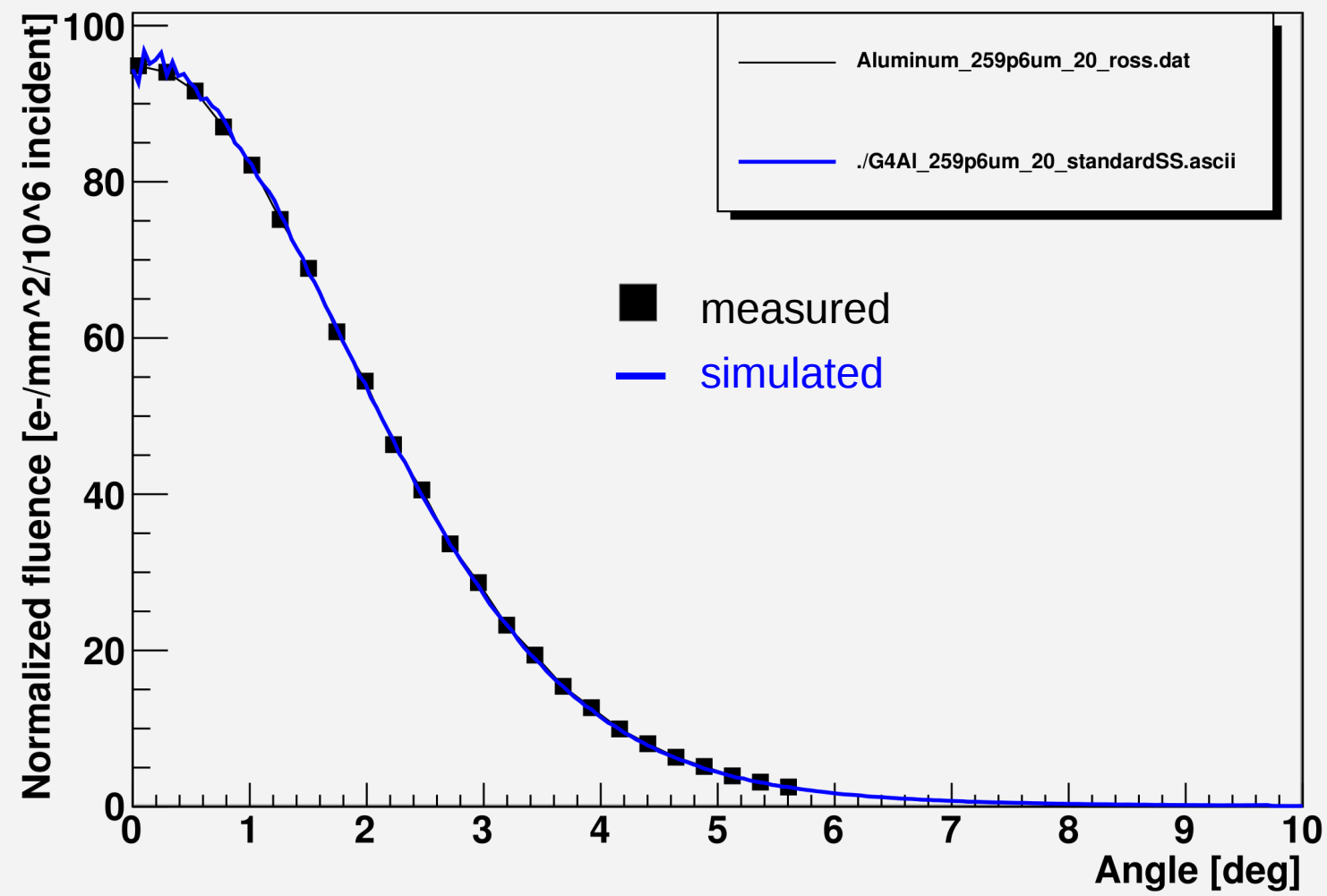
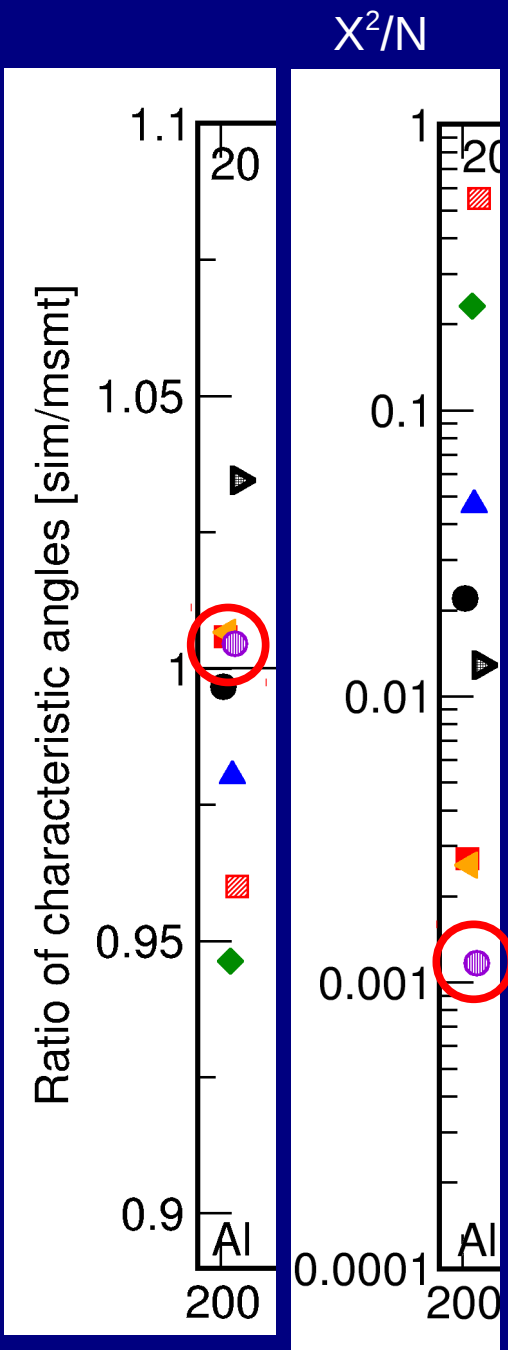
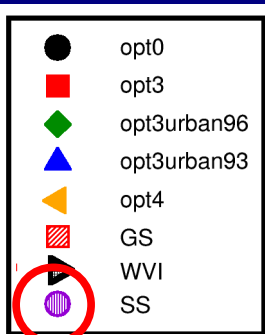
7 materials, various thickness, 13 and 20 MeV





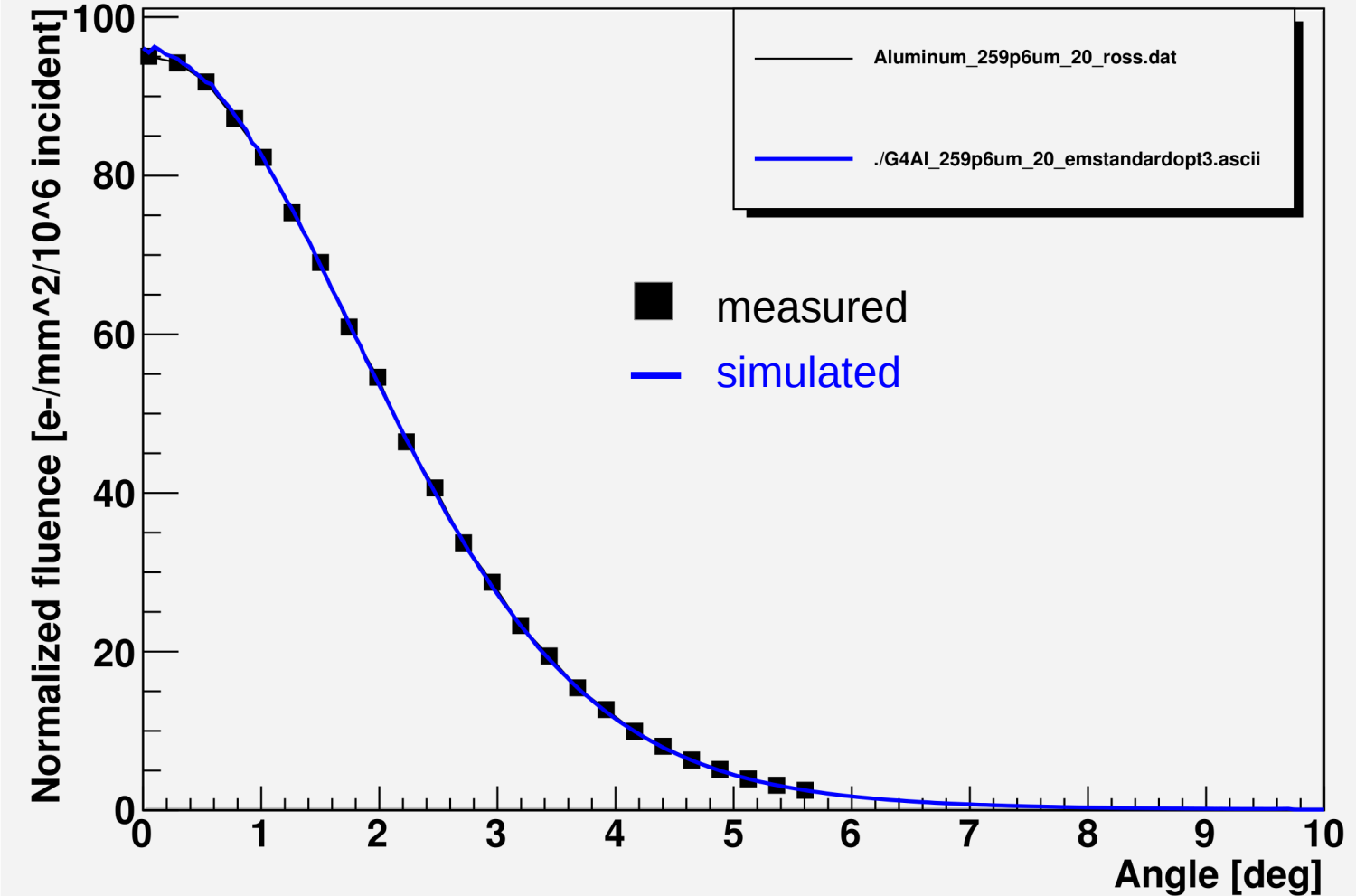
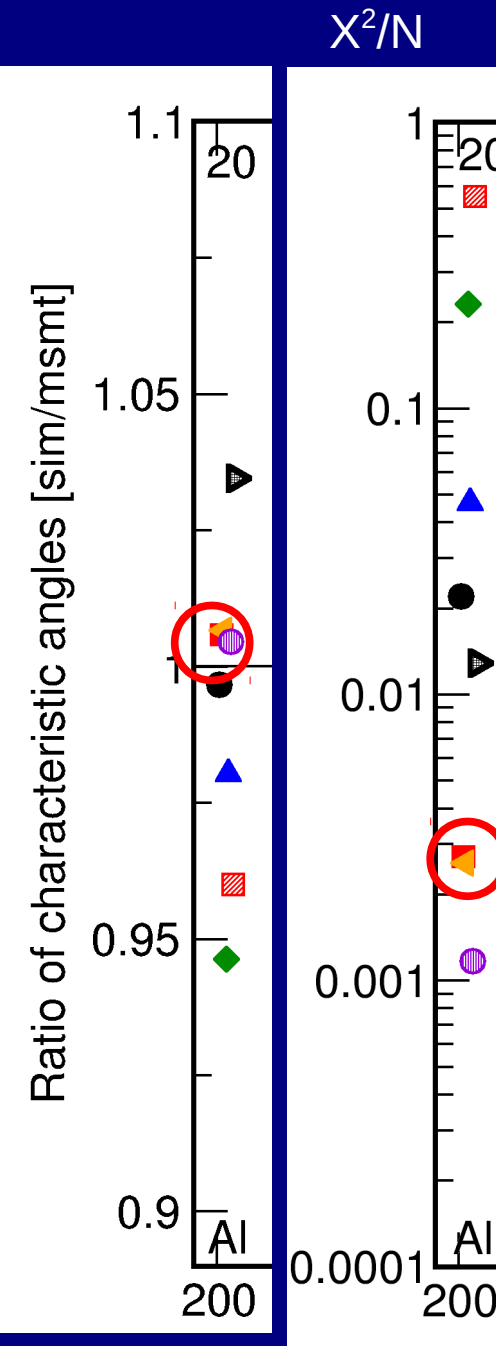
# Single scattering

Aluminum, thinnest foil, 20 MeV



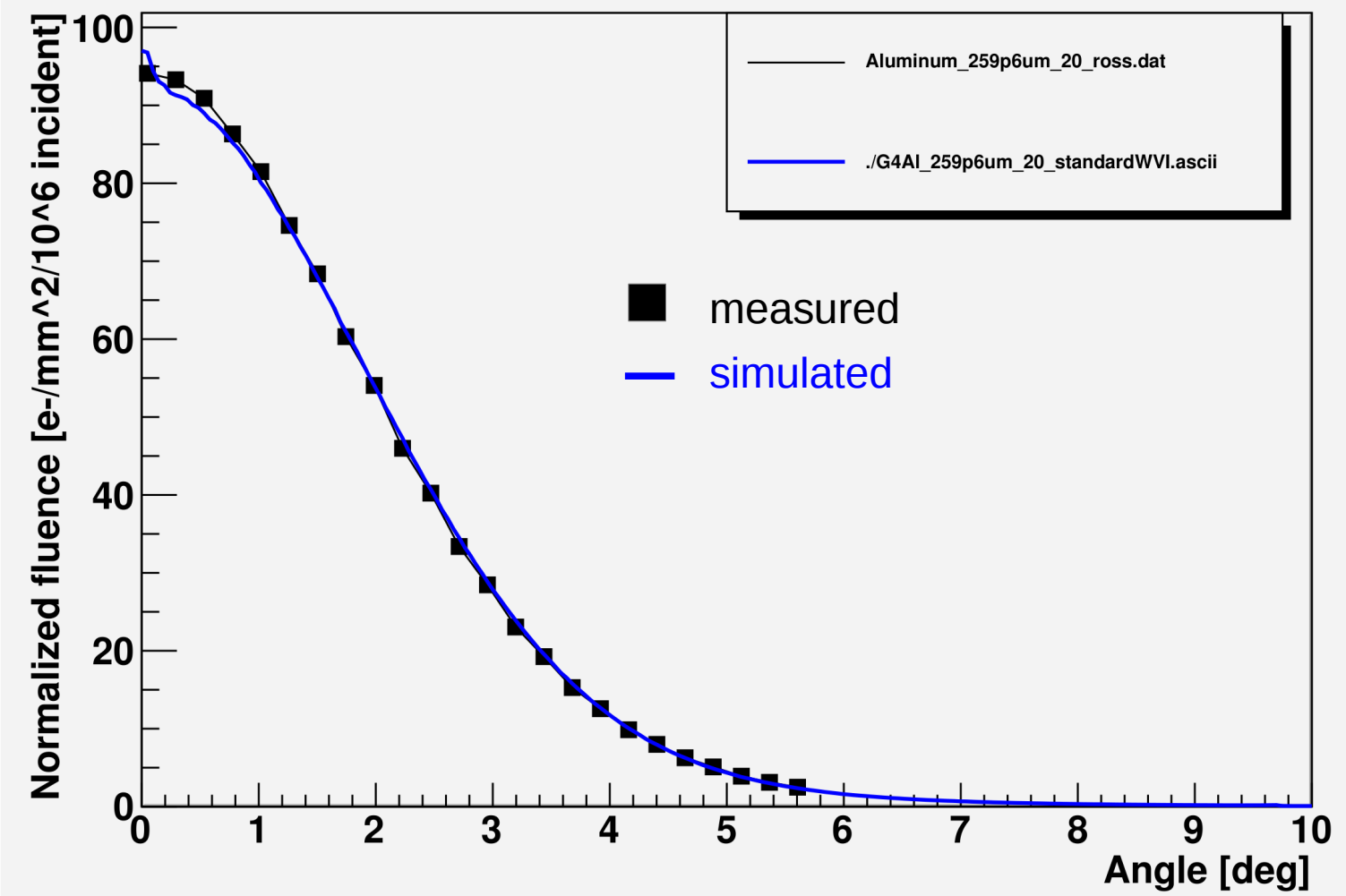
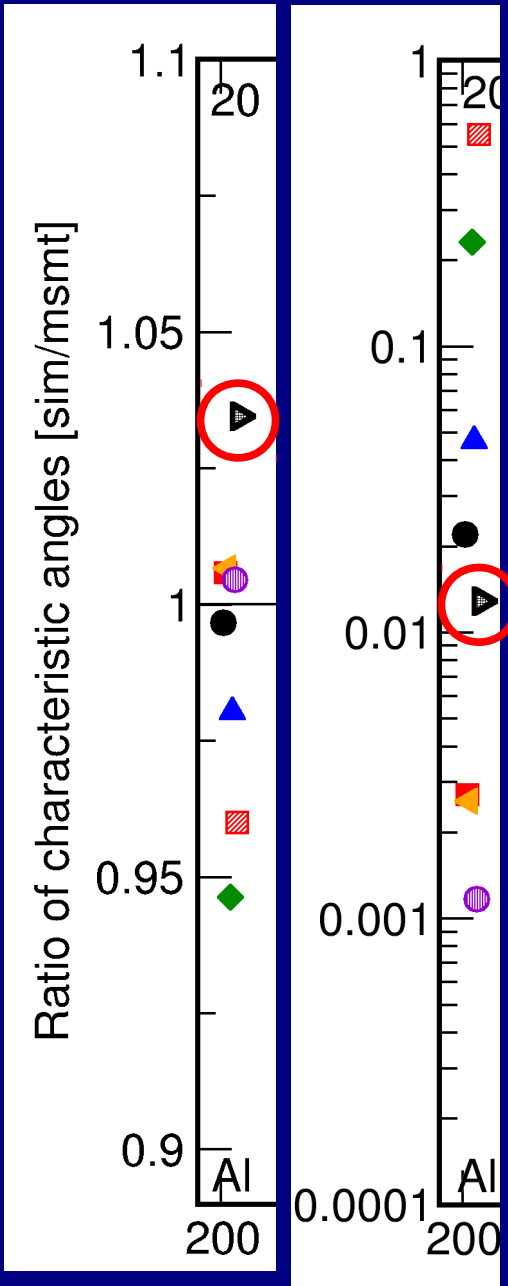
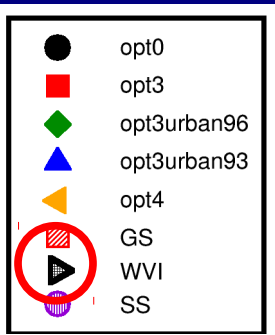
# Urban95 Option 3

Aluminum, thinnest foil, 20 MeV



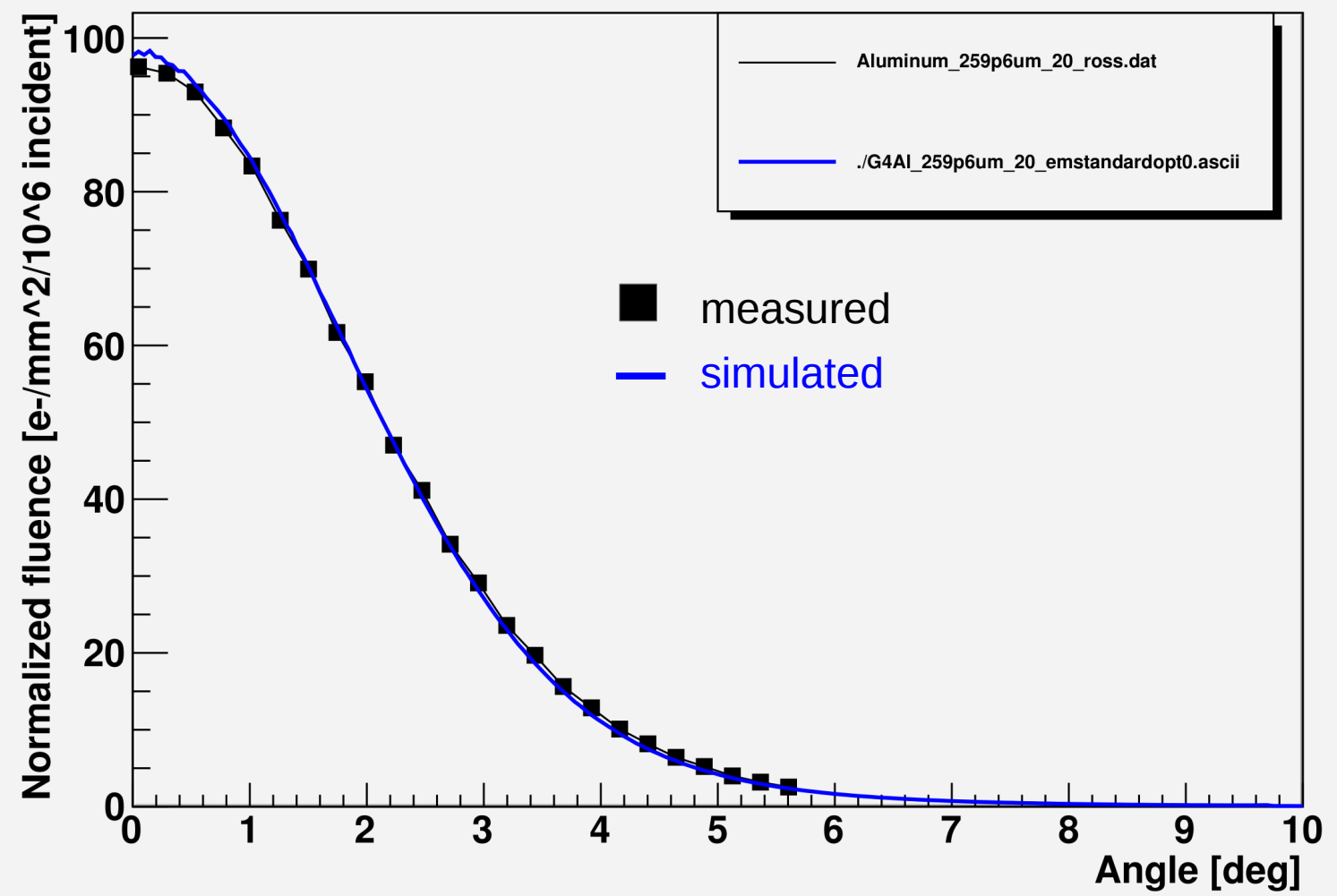
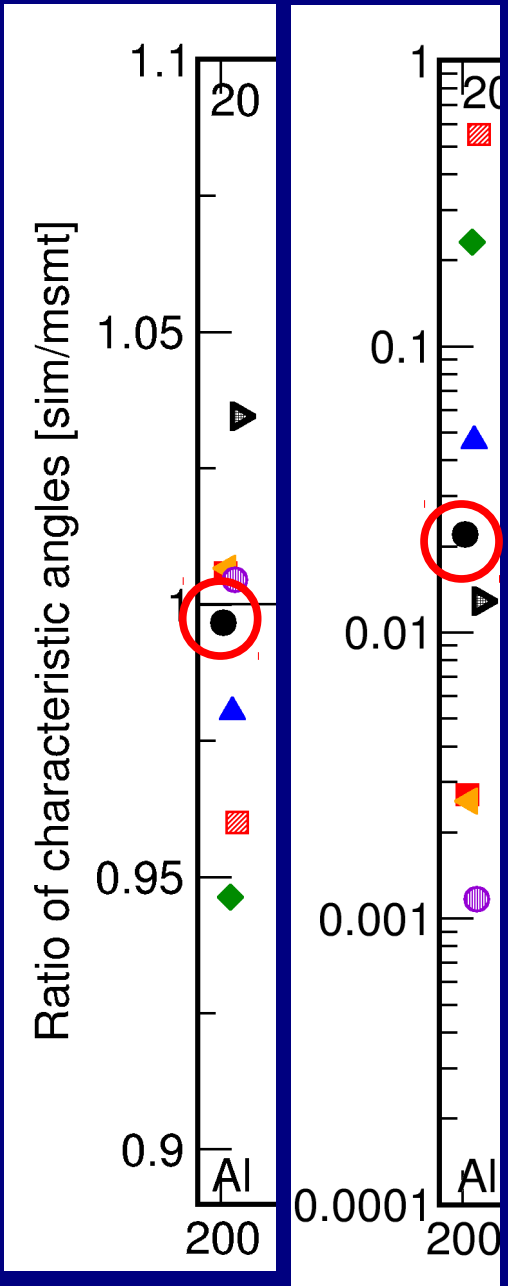
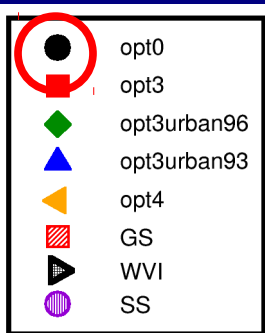
# Wentzel VI

Aluminum, thinnest foil, 20 MeV



# Urban95 Option 0

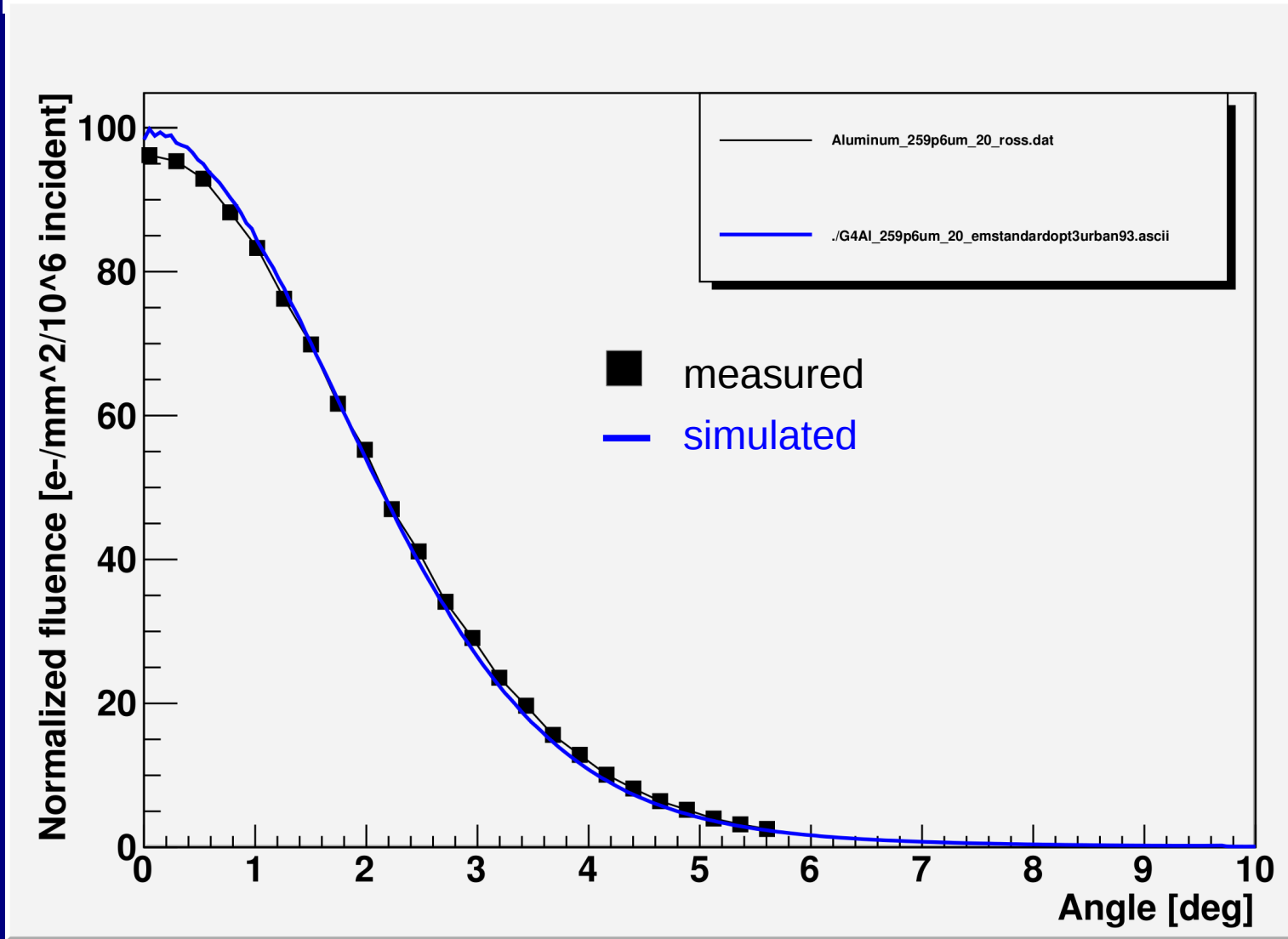
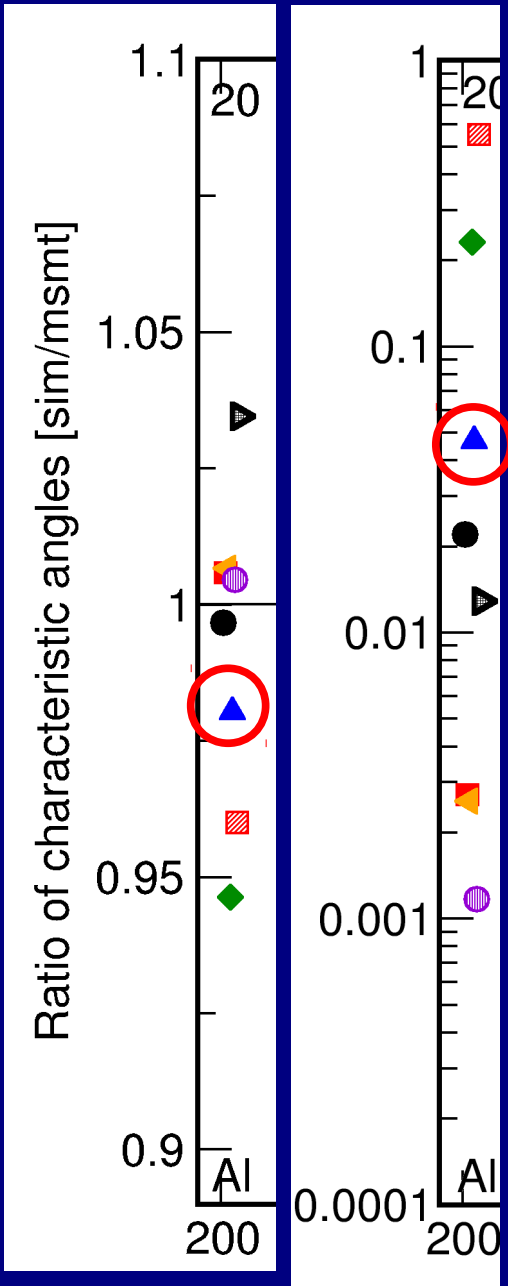
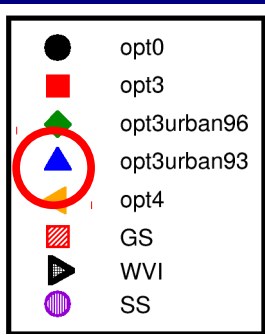
Aluminum, thinnest foil, 20 MeV





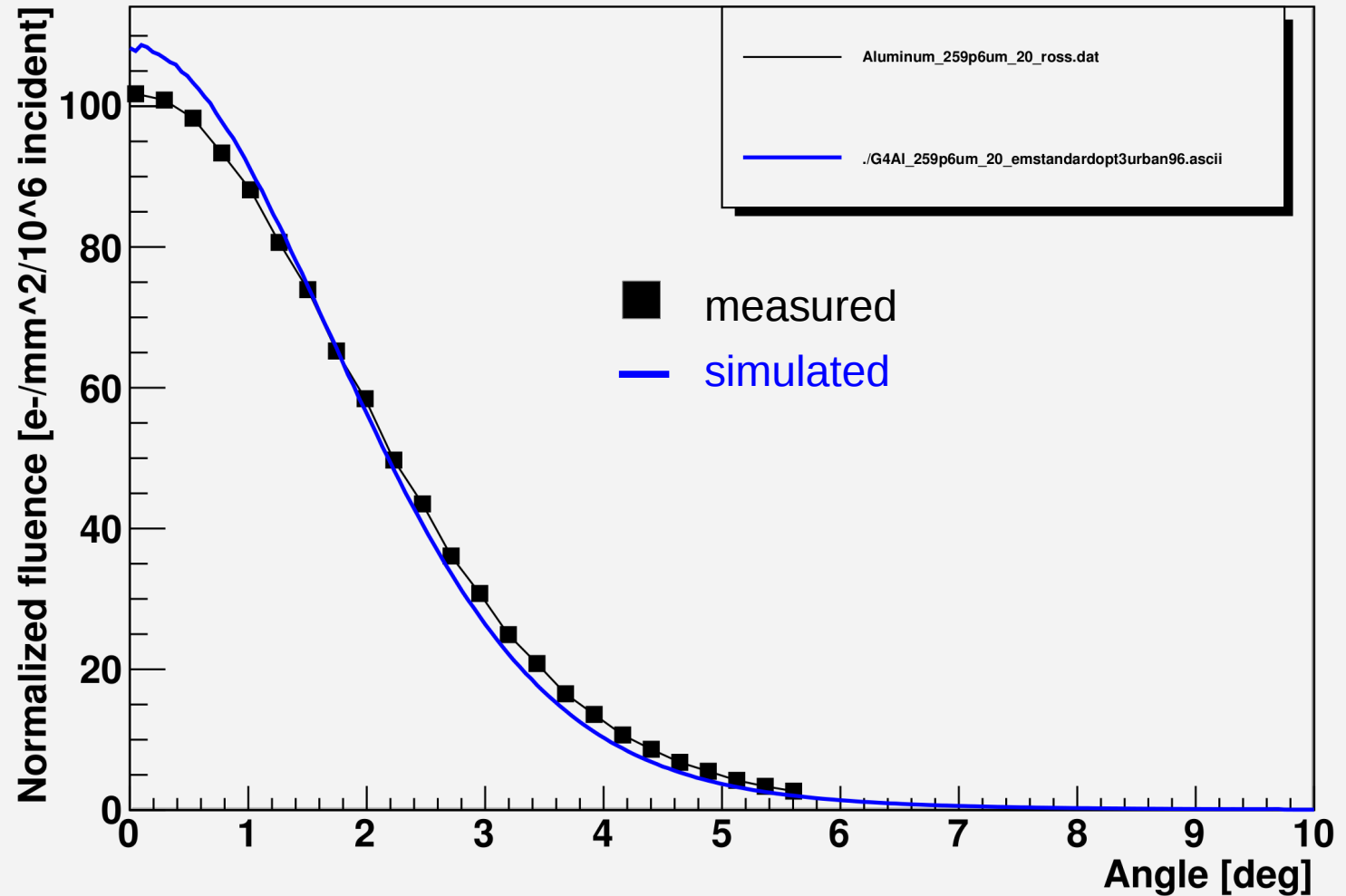
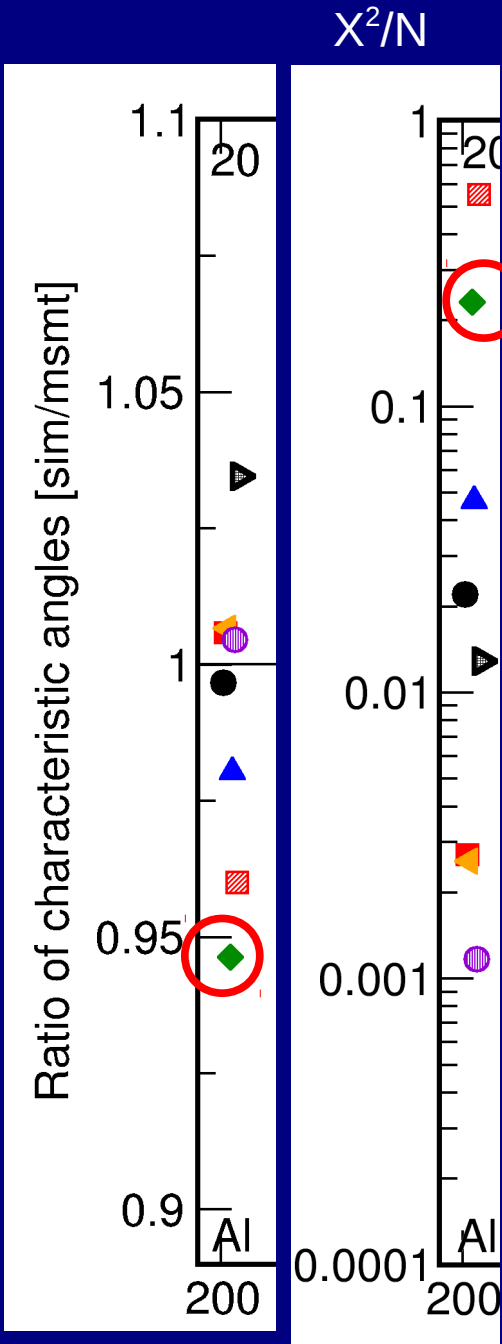
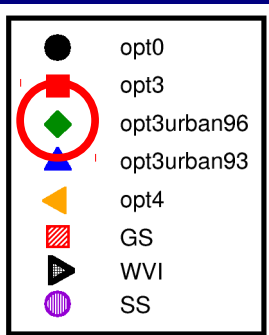
# Urban93 Option 3

Aluminum, thinnest foil, 20 MeV



# Urban96 Option 3

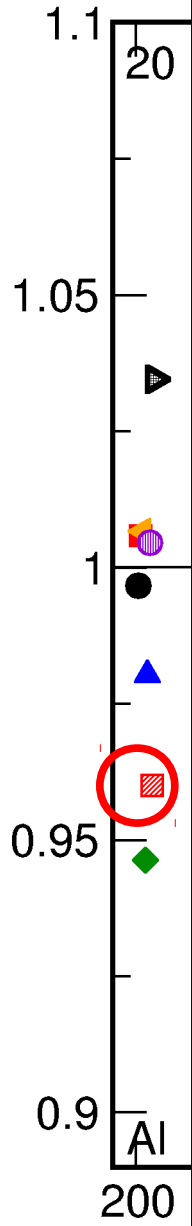
Aluminum, thinnest foil, 20 MeV



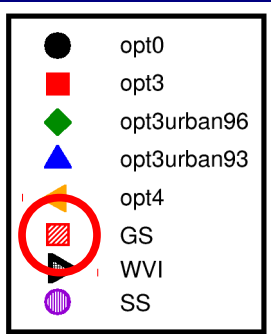
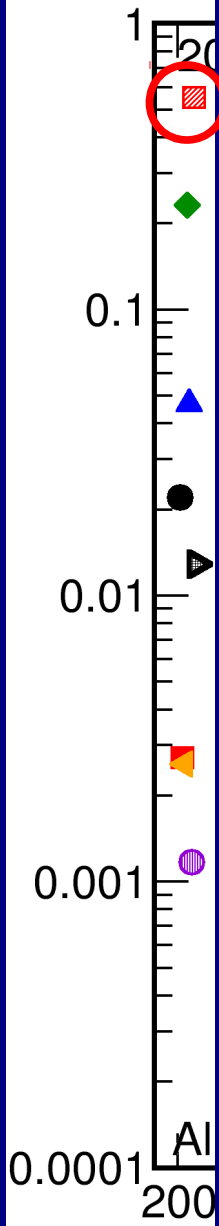
# Goudsmit-Saunderson

Aluminum, thinnest foil, 20 MeV

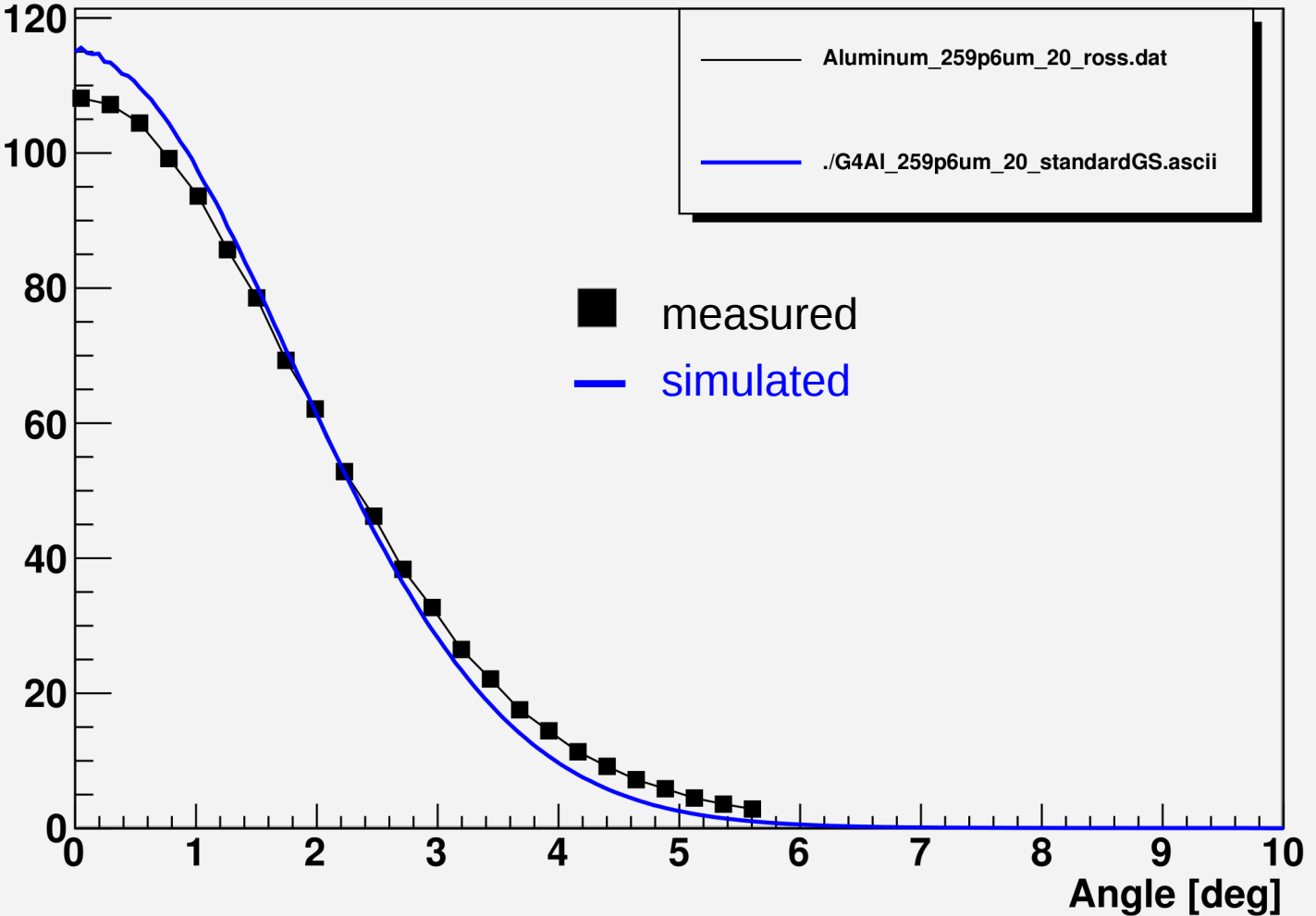
Ratio of characteristic angles [sim/msmt]

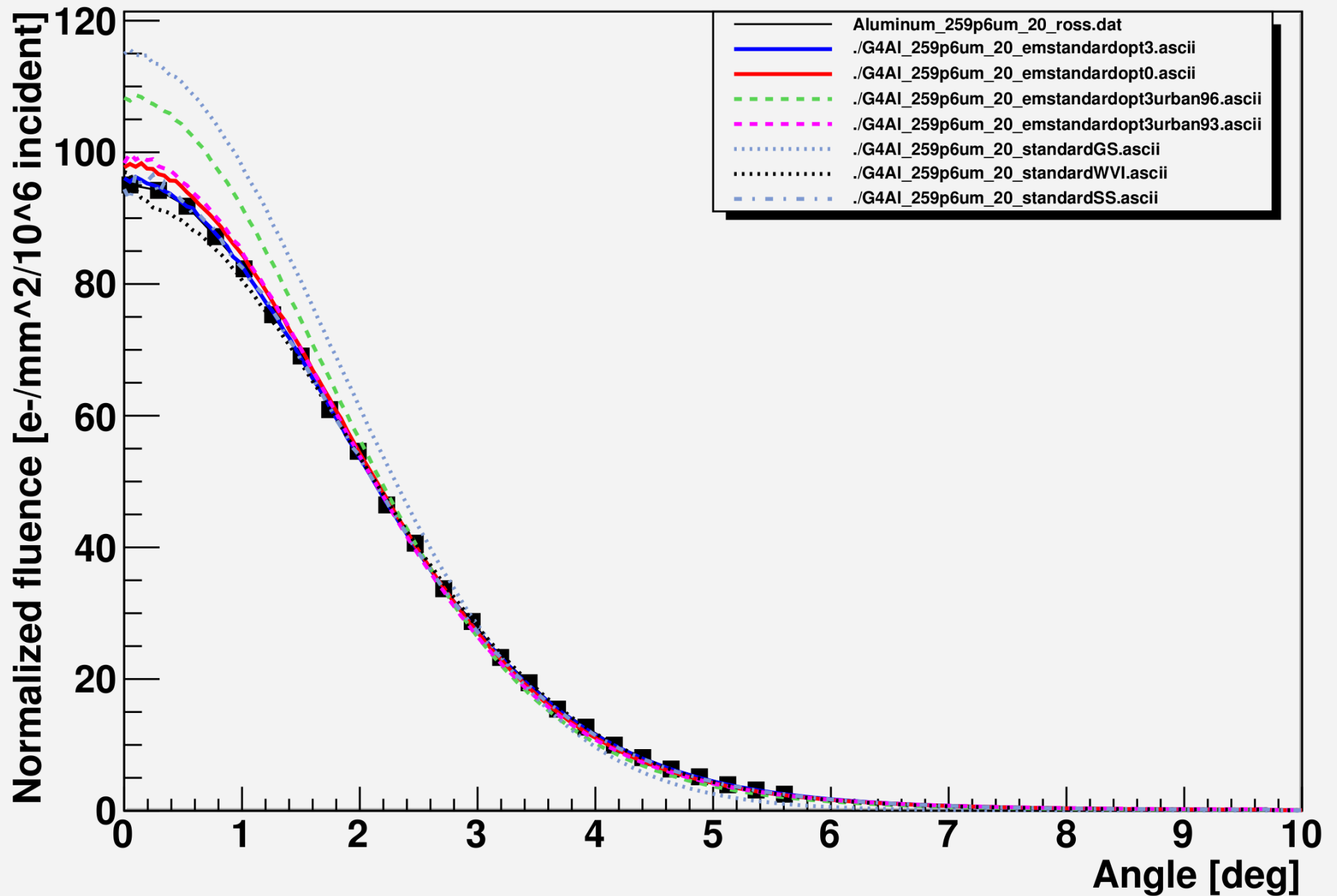


$\chi^2/N$



Normalized fluence [ $e^-/mm^2/10^6$  incident]



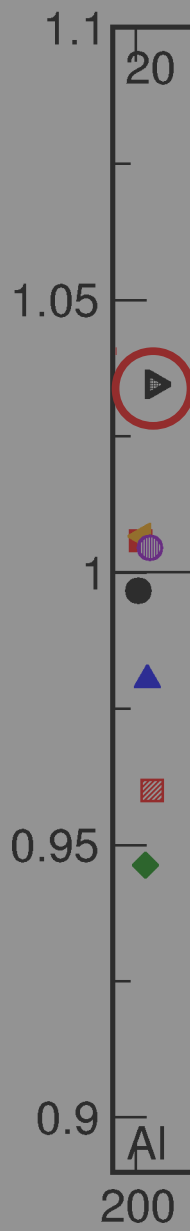


# Wentzel VI

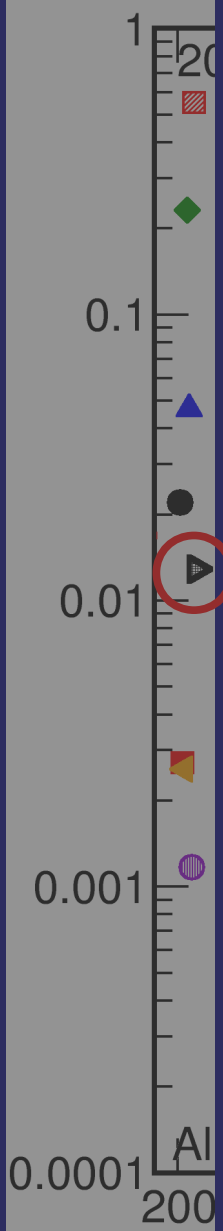
Aluminum, thinnest foil, 20 MeV



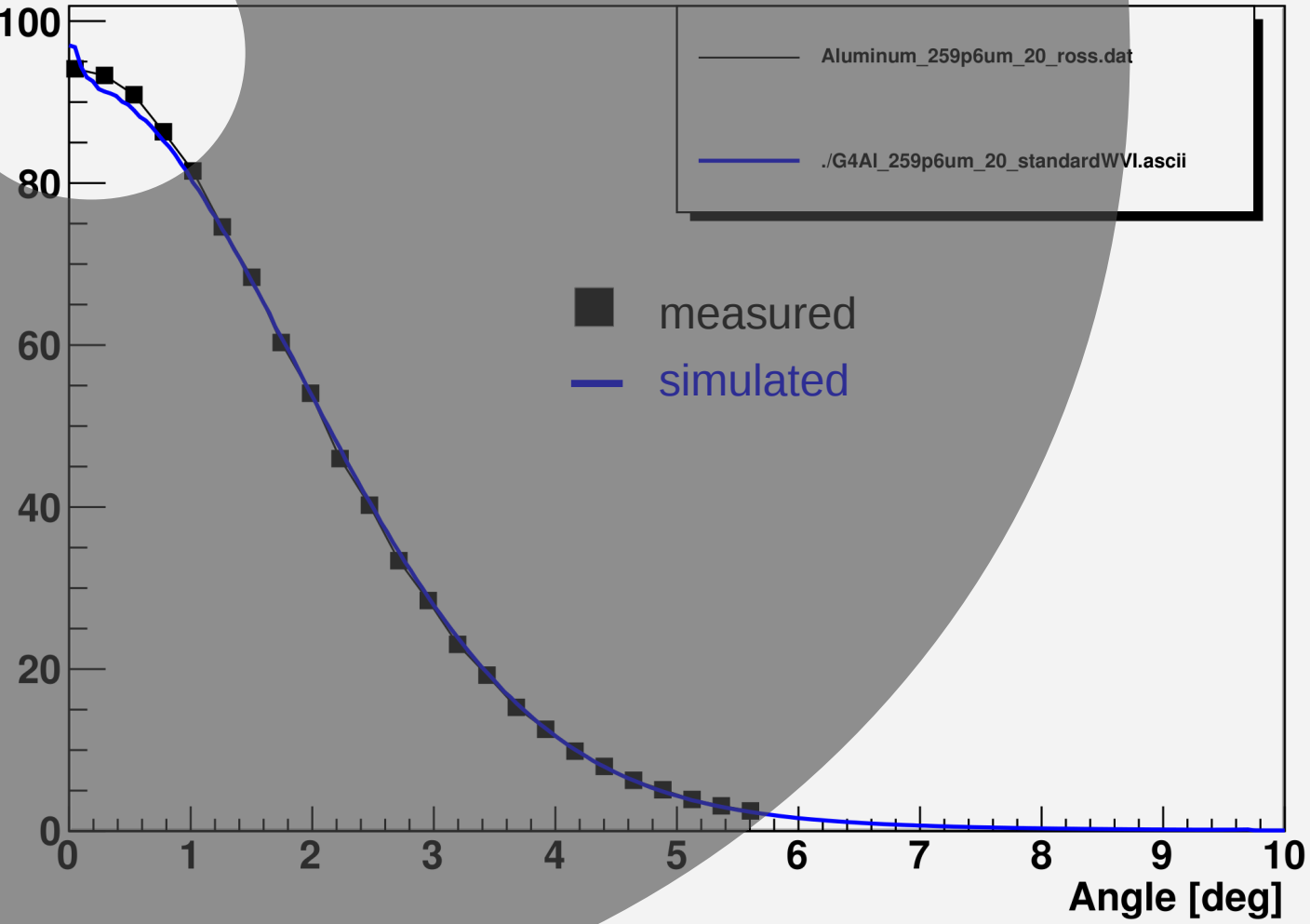
Ratio of characteristic angles [sim/msmt]



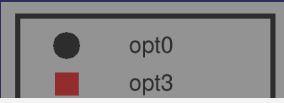
$\chi^2/N$



Normalized fluence [e-/mm<sup>2</sup>/10<sup>6</sup> incident]

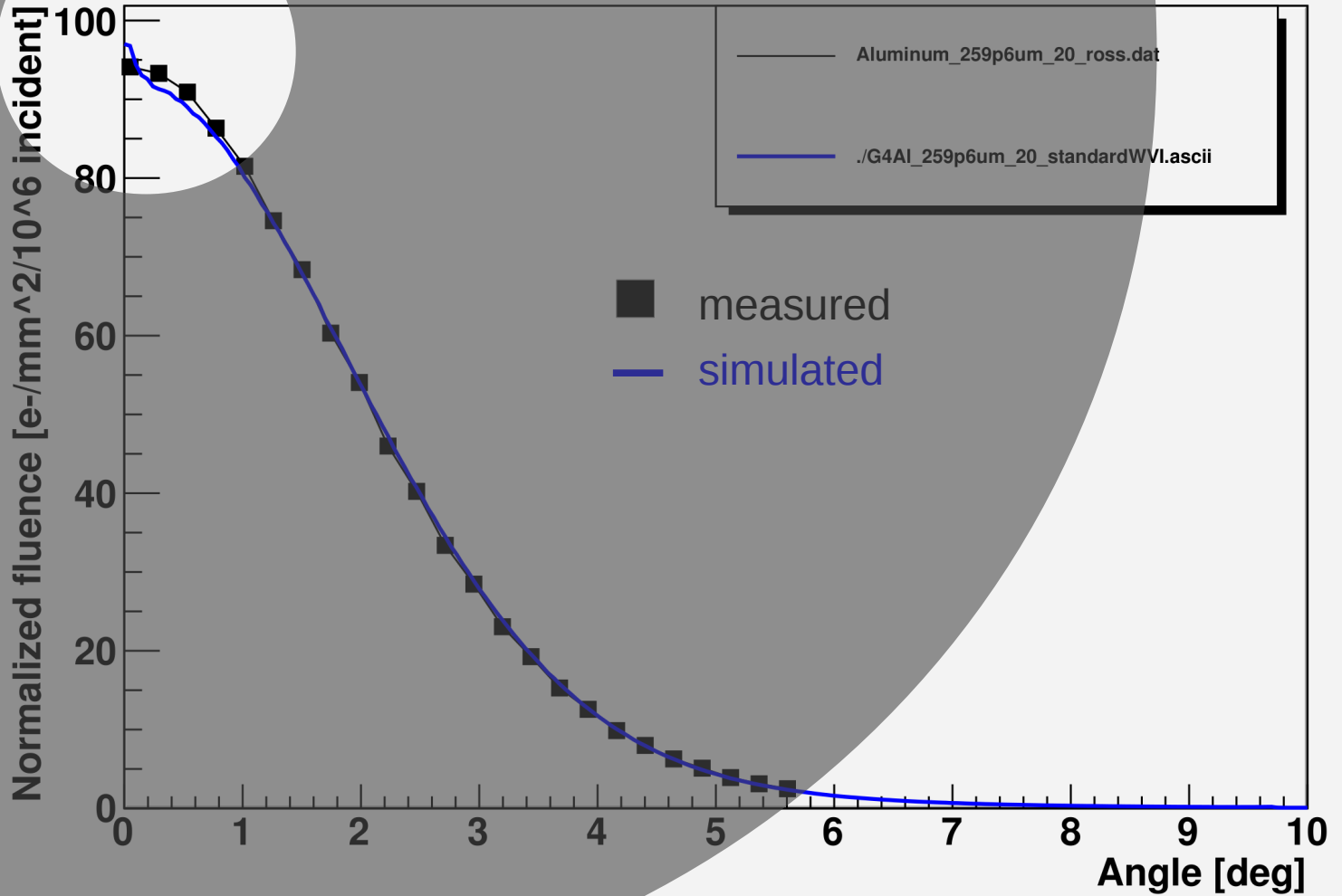
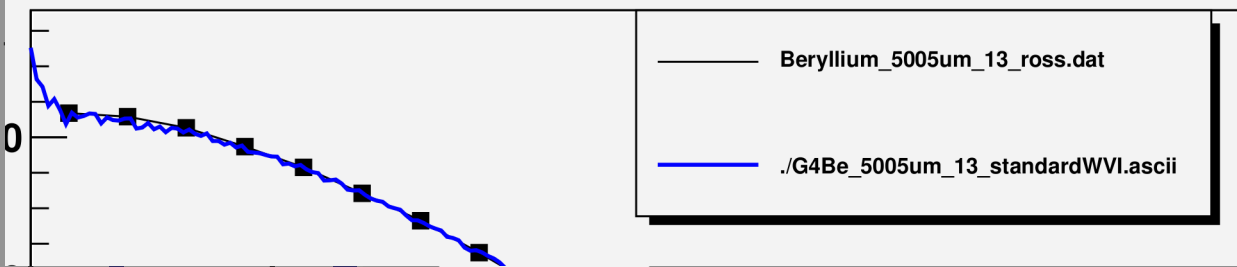
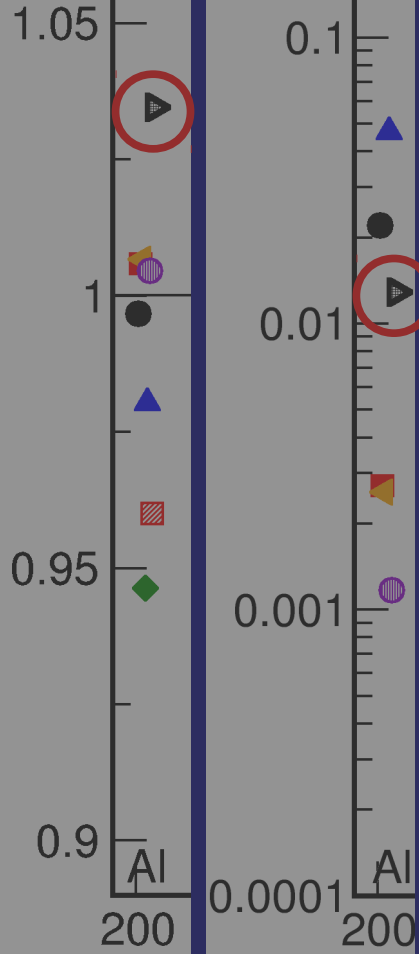


$\chi^2/N$

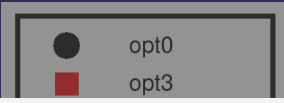


20 MeV

Ratio of characteristic angles [sim/msmt]

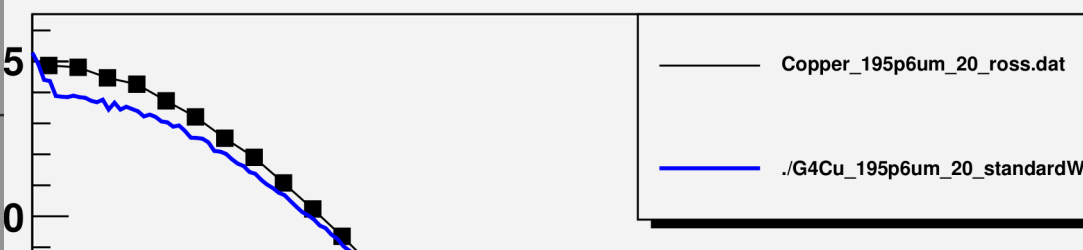
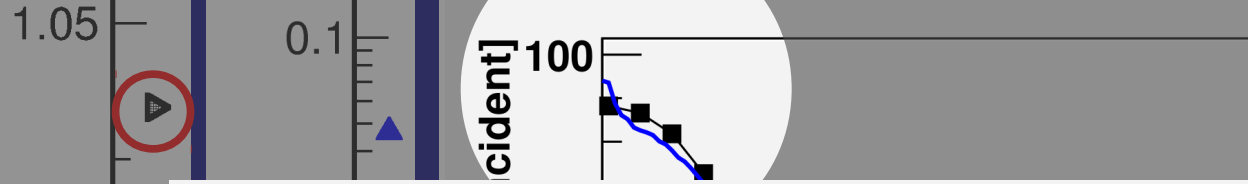
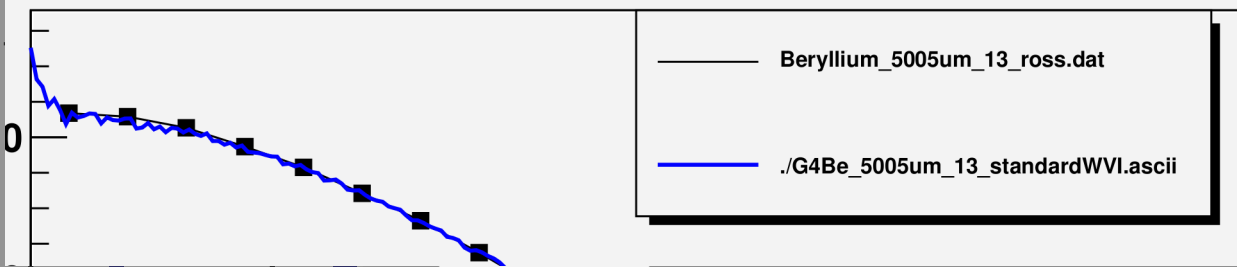


$\chi^2/N$

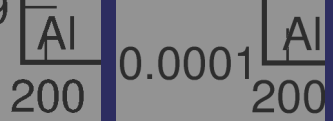
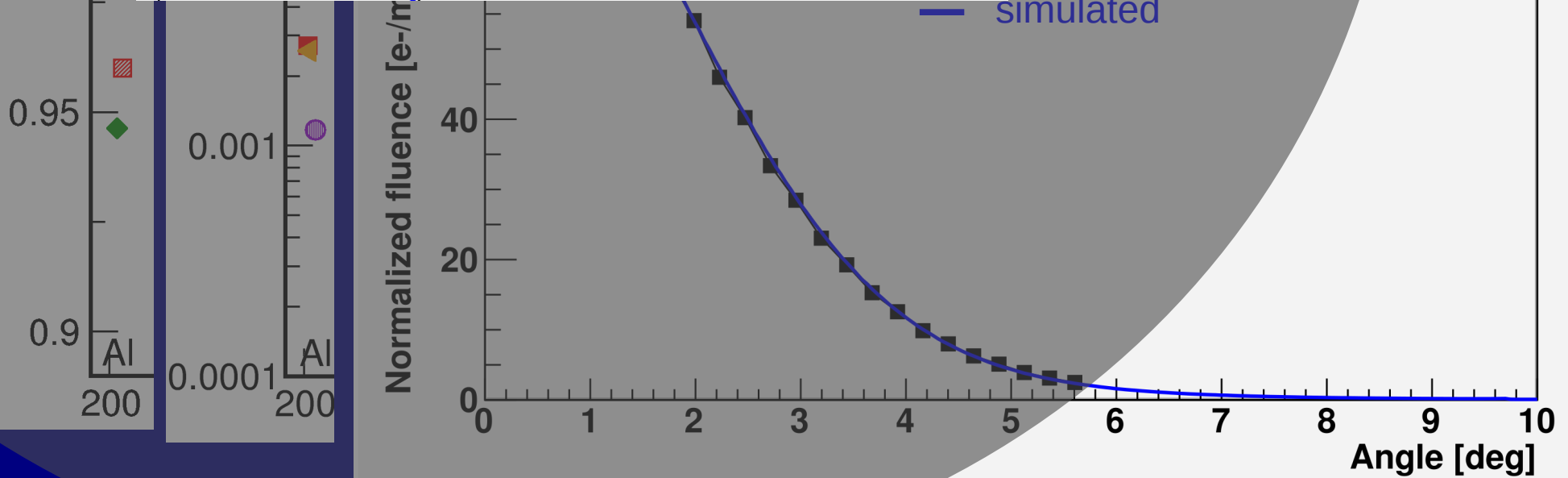


20 MeV

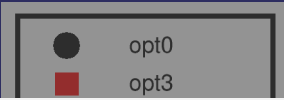
Ratio of characteristic angles [sim/msmt]



measured  
— simulated

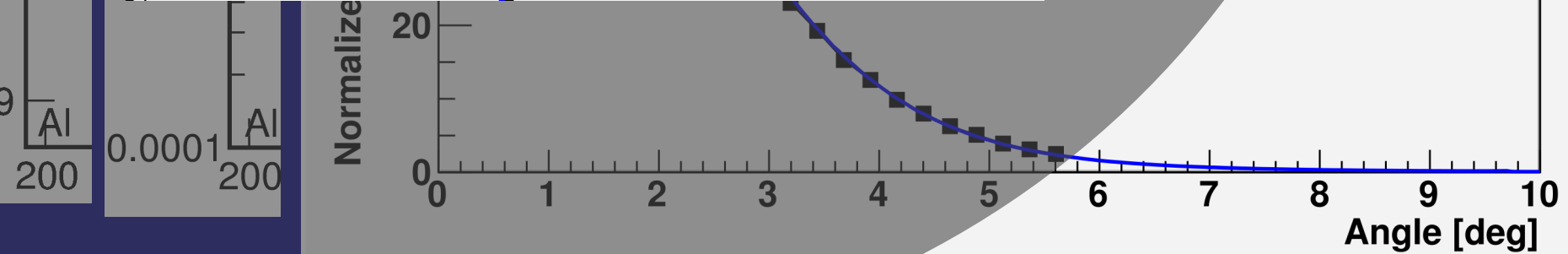
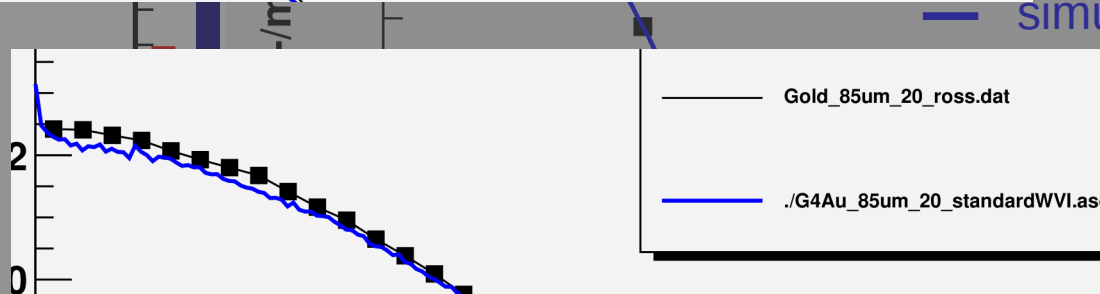
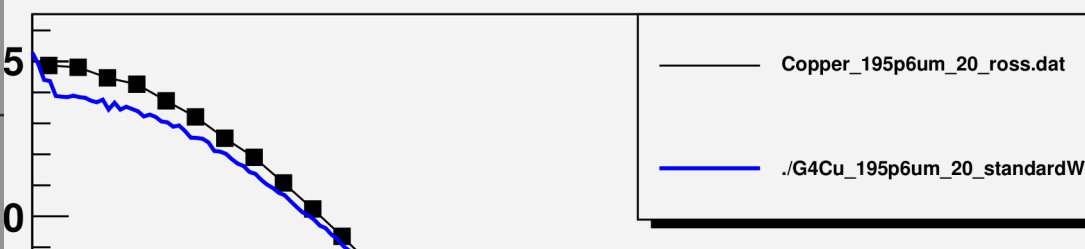
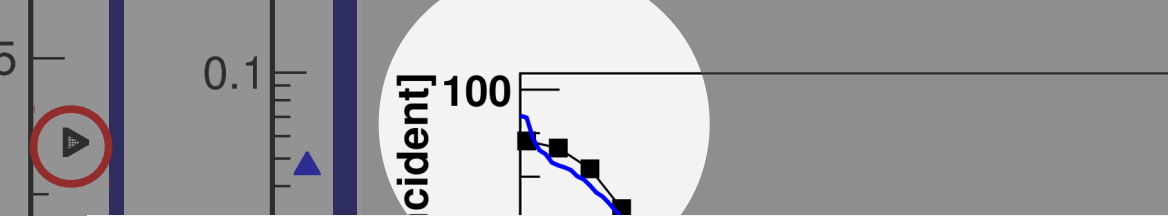
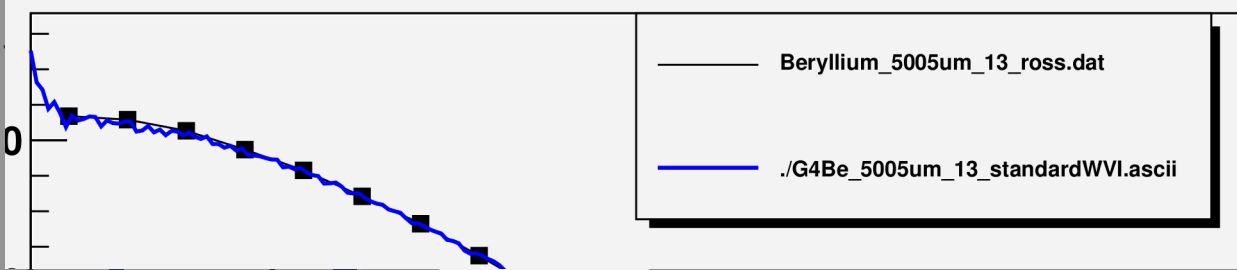


$\chi^2/N$



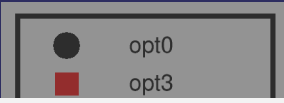
20 MeV

Ratio of characteristic angles [sim/msmt]



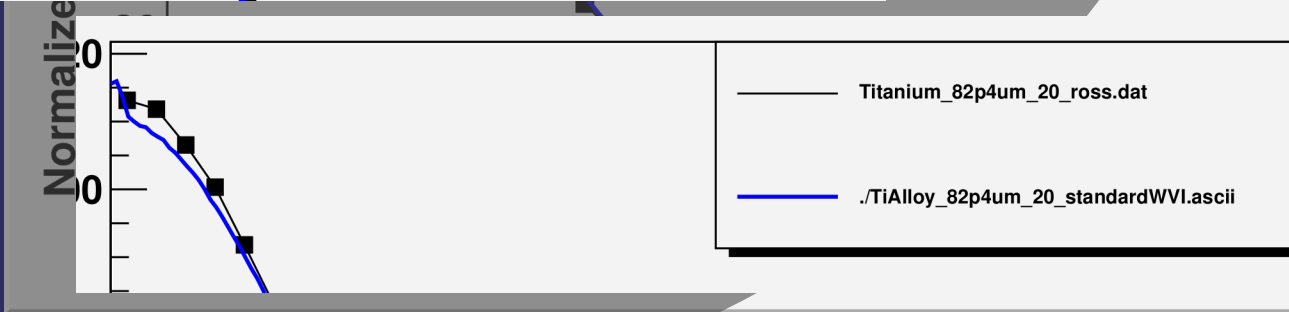
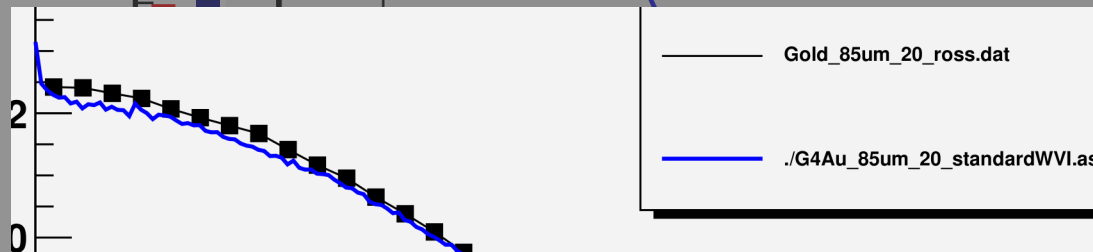
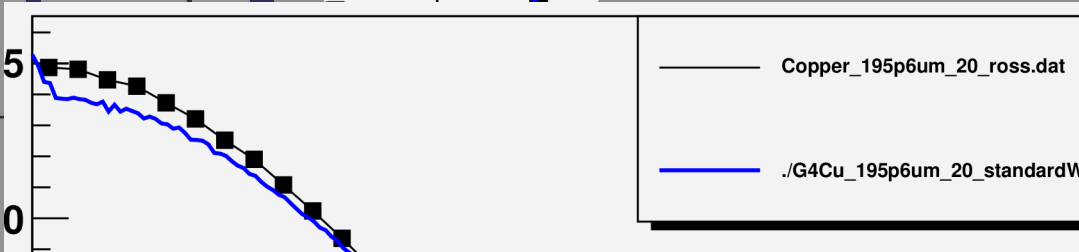
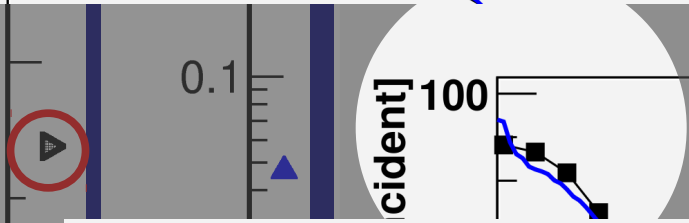
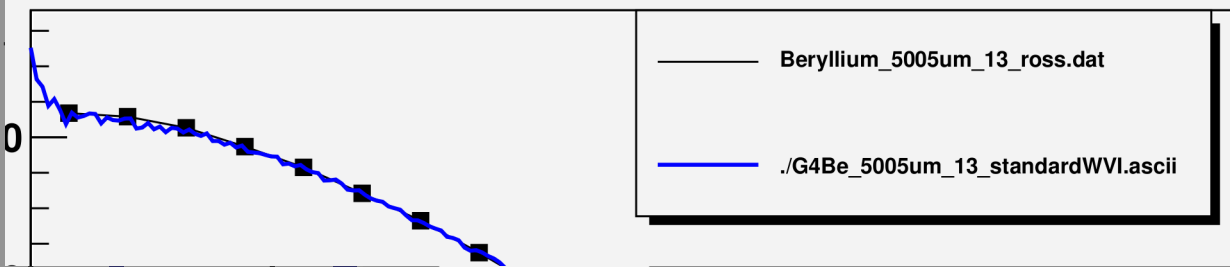


$\chi^2/N$

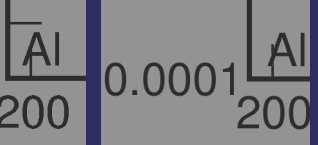


20 MeV

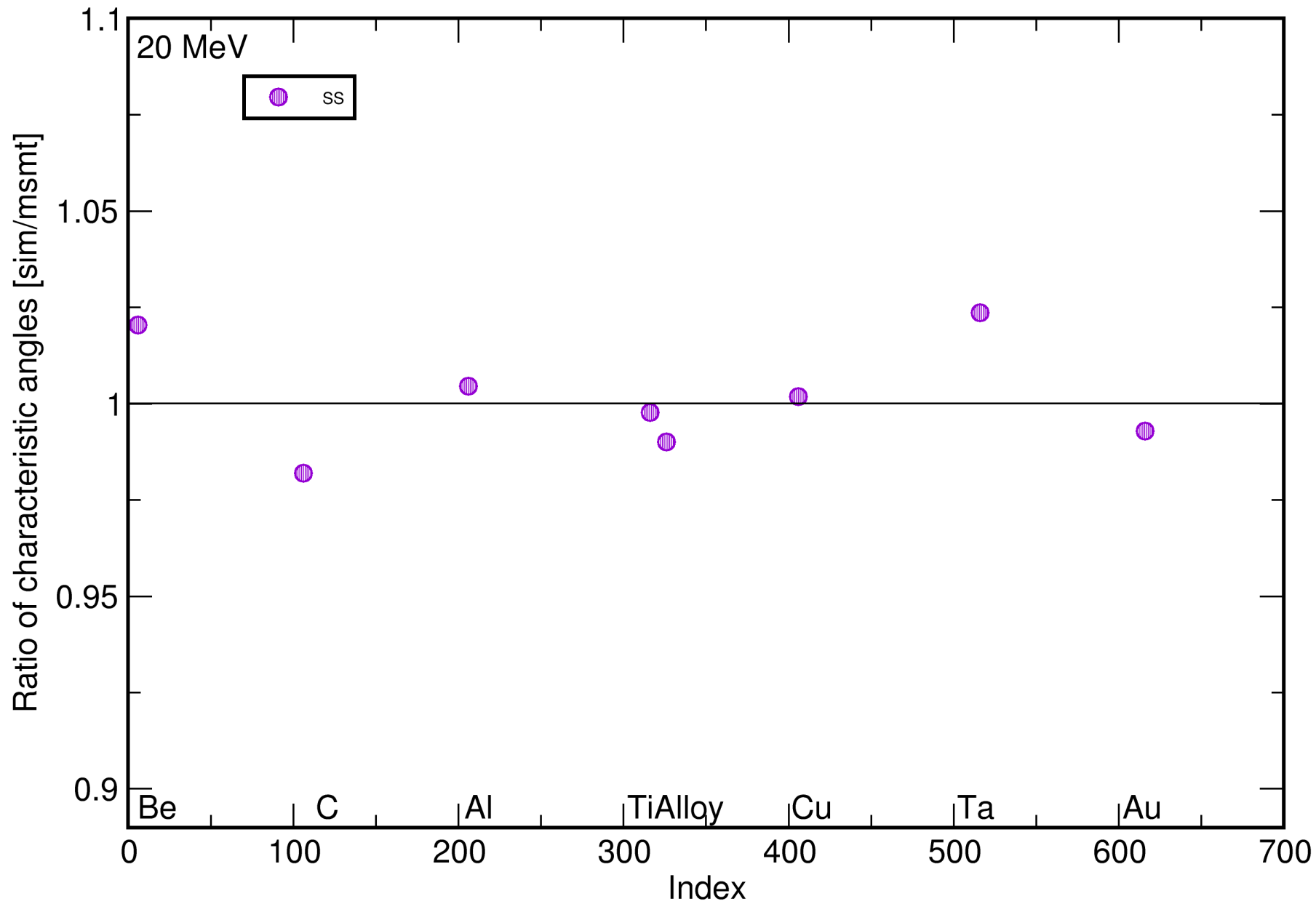
Ratio of characteristic angles [sim/msmt]

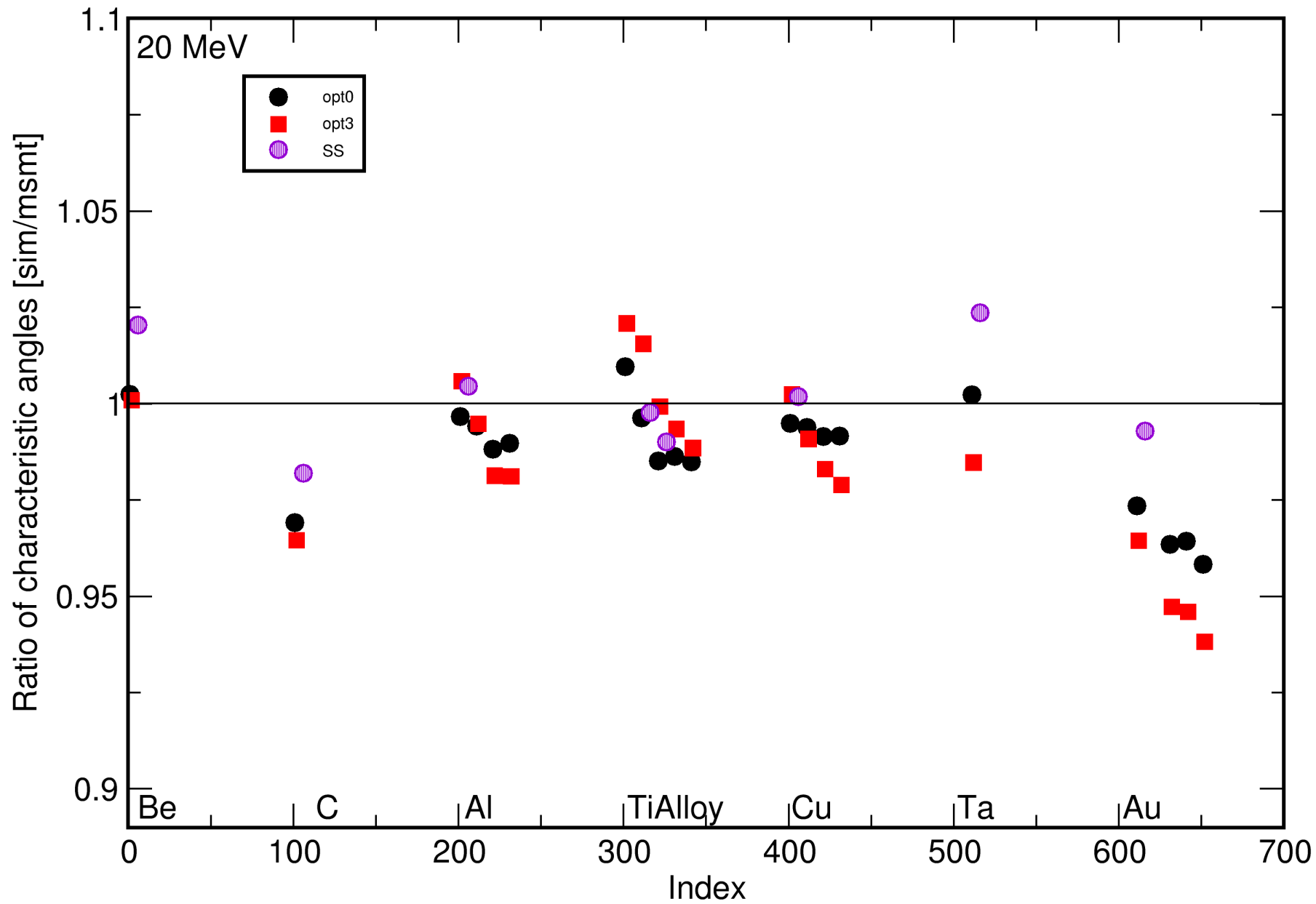


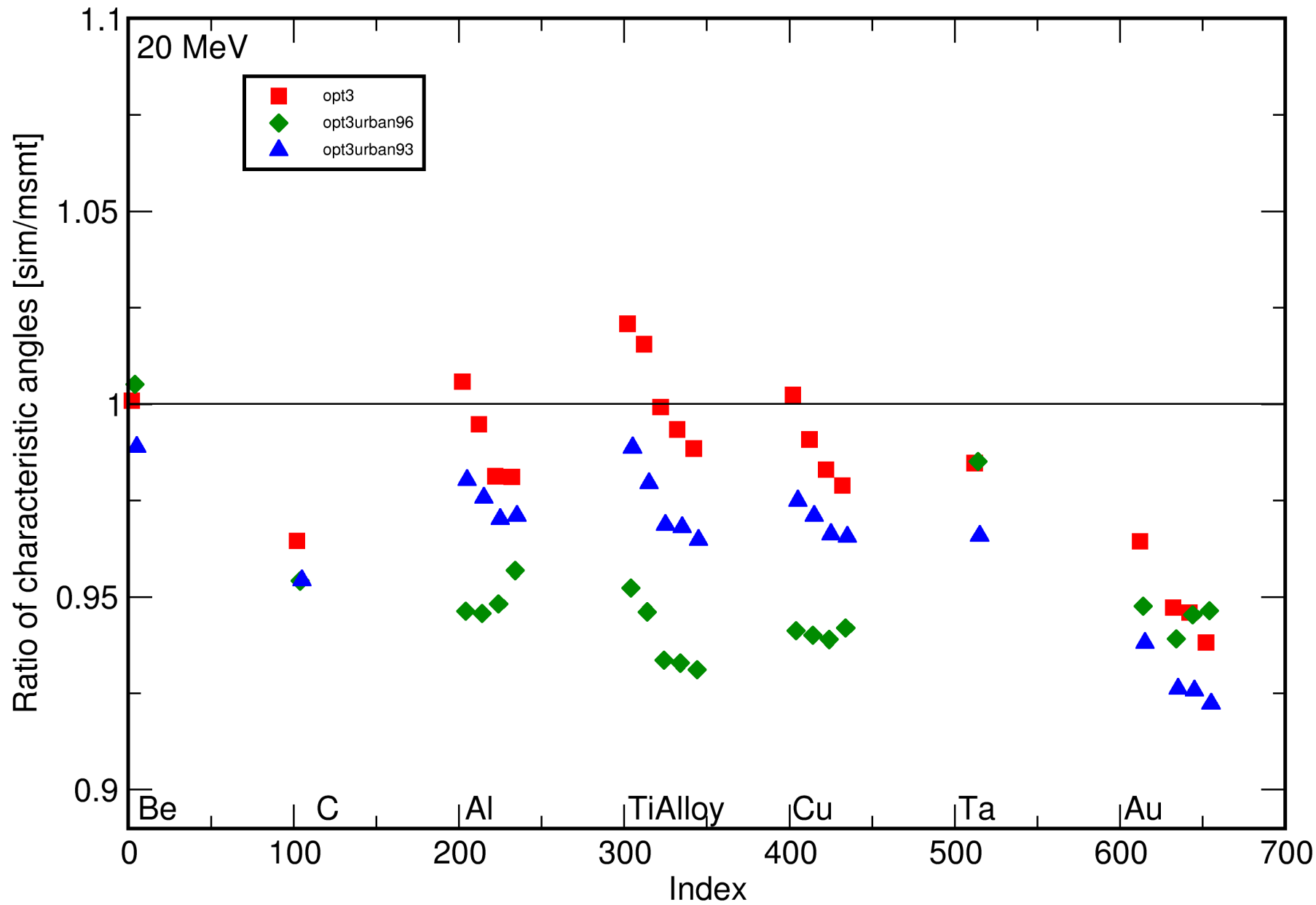
measured  
— simulated

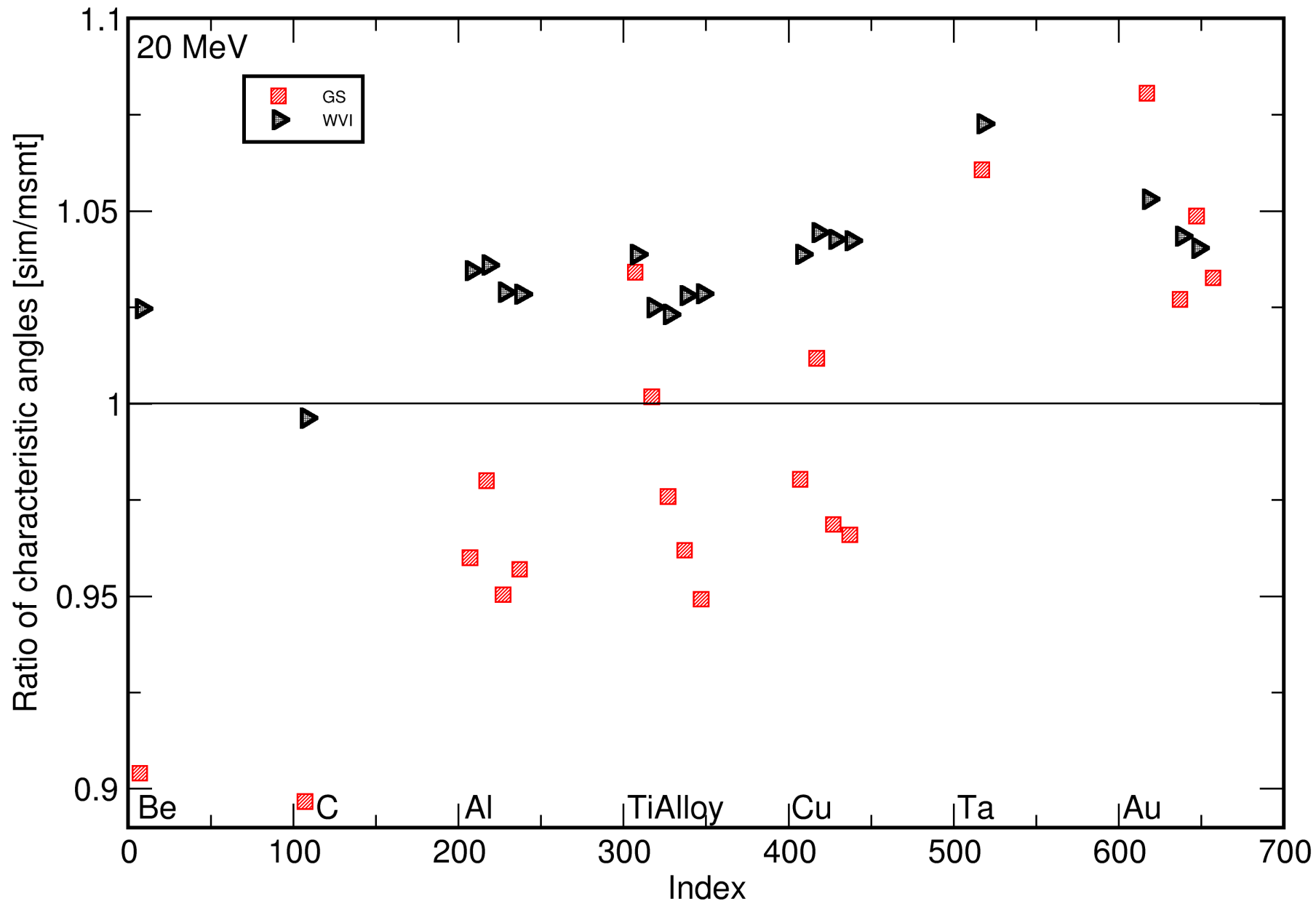


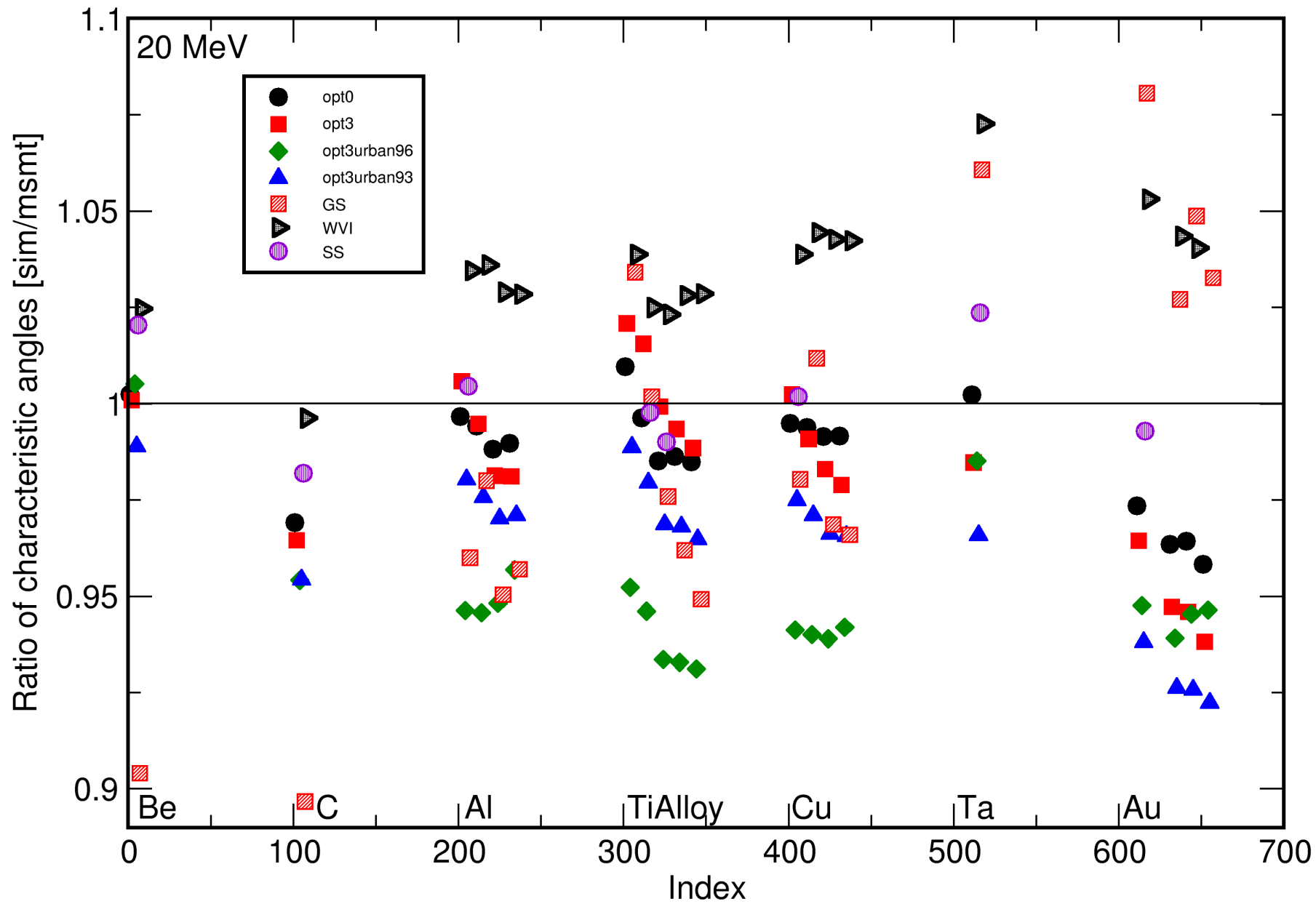
9 10  
angle [deg]

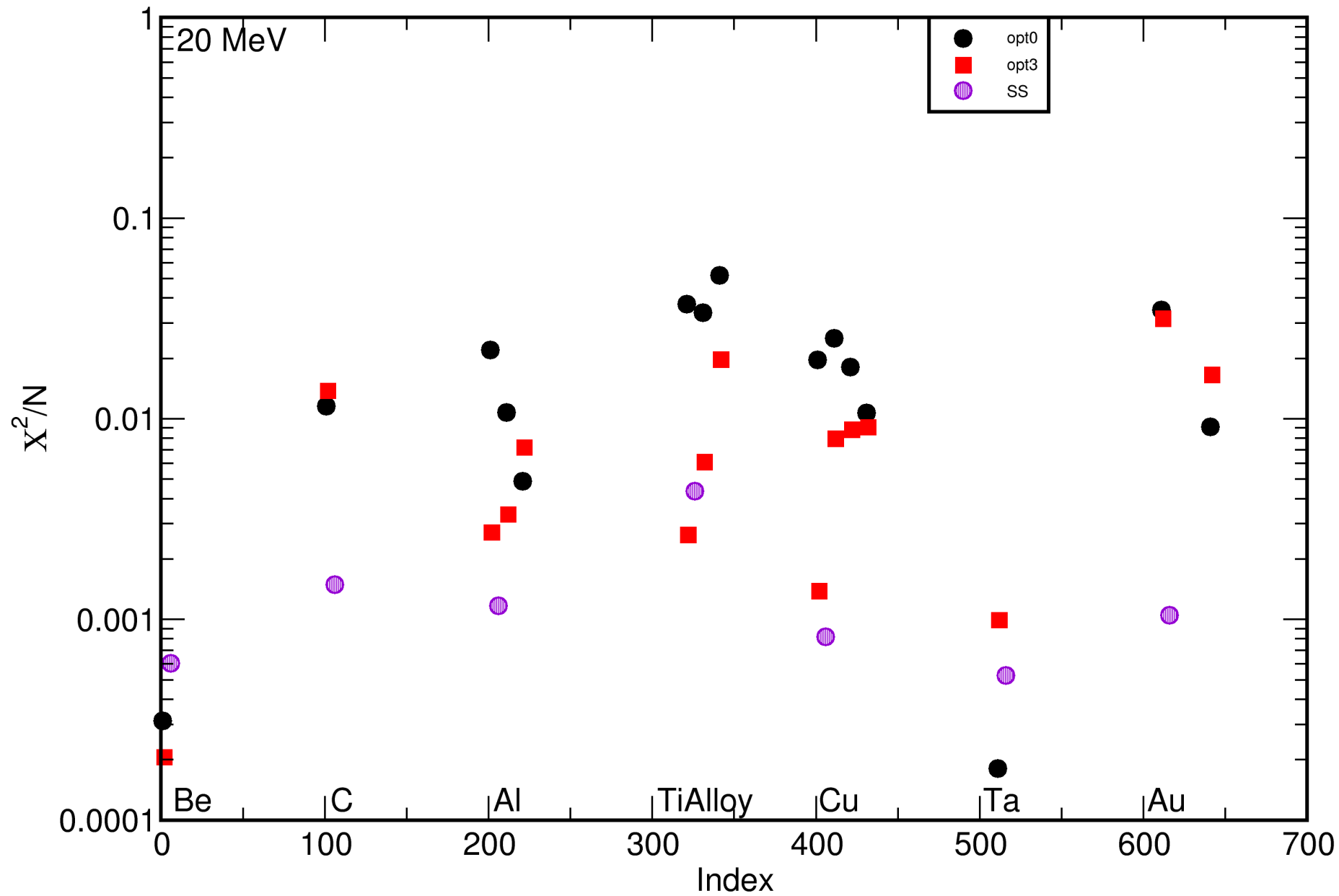


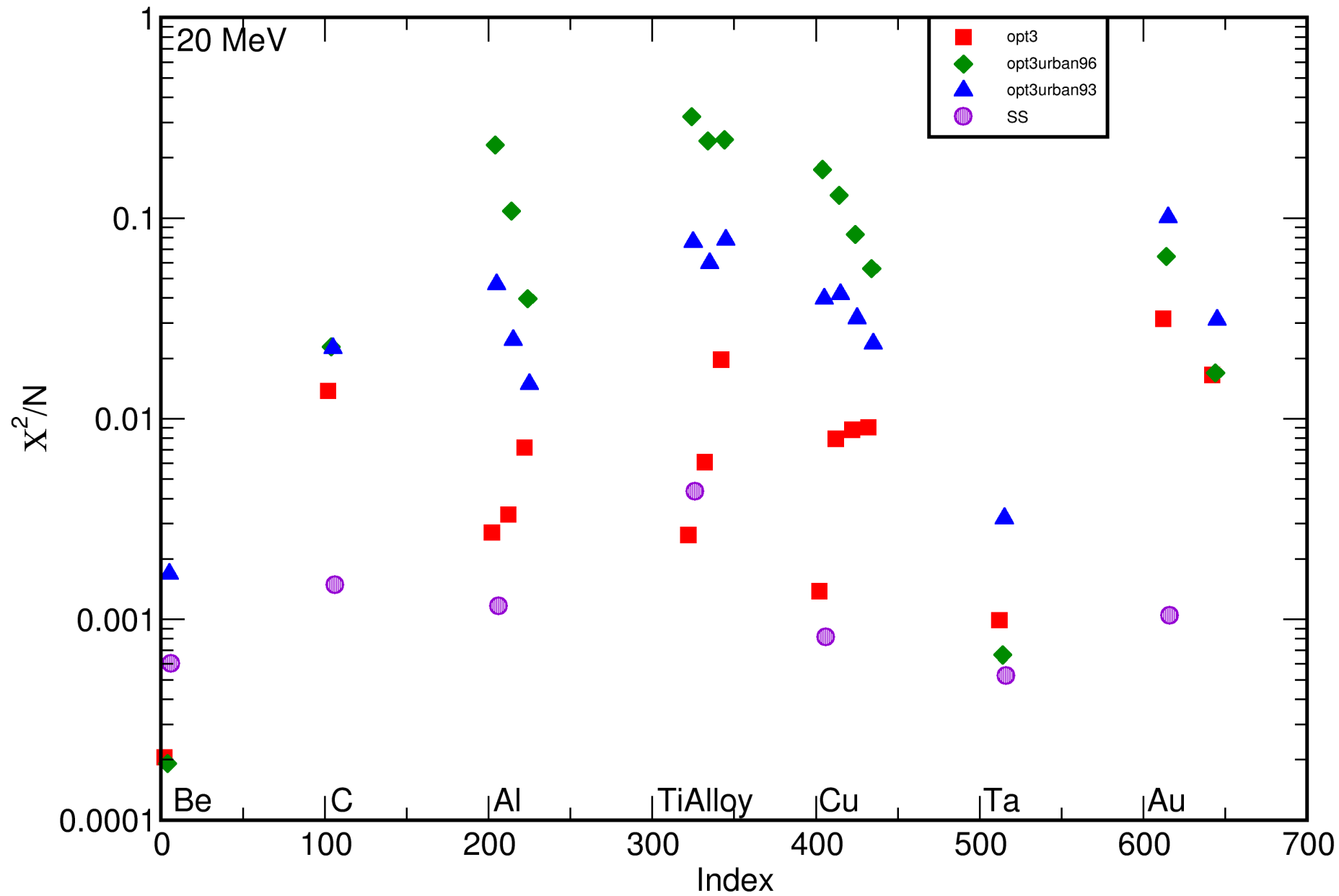




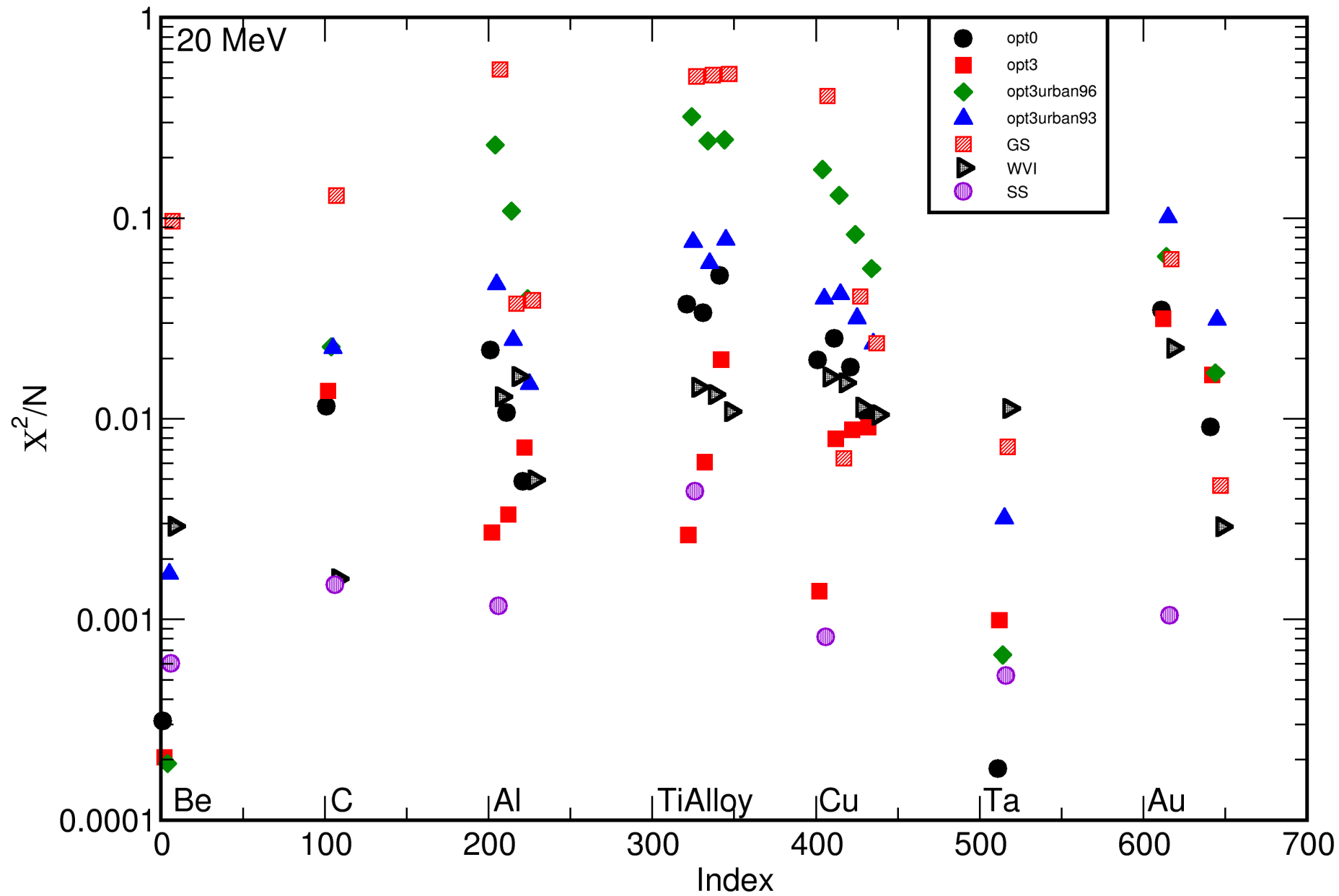




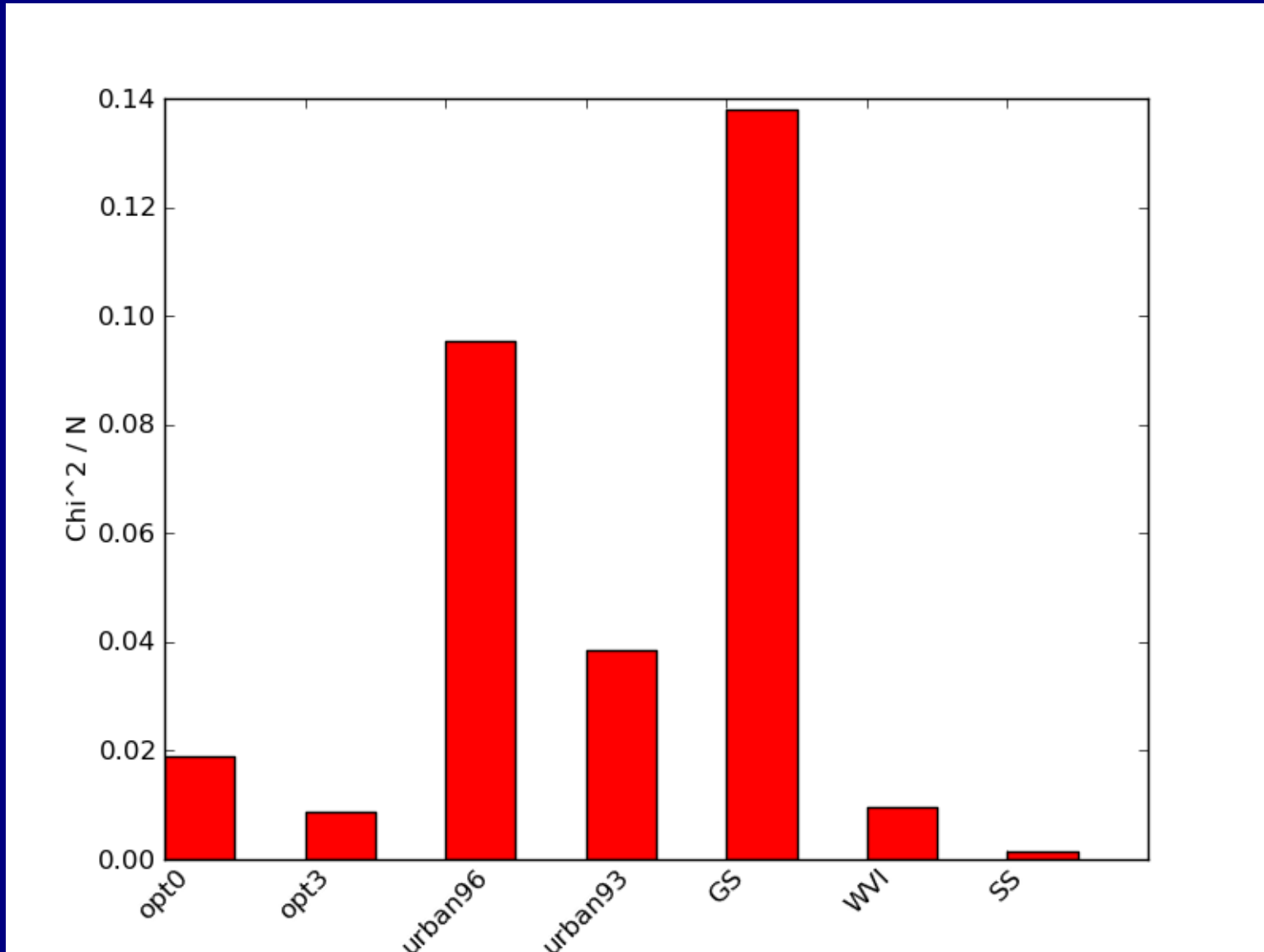








# Average $\chi^2/N$ (13 and 20 MeV)



# Conclusions:

- Single scattering matches data well
- other models vary
- large variation in amplitude of peak
- Urban95 > Urban93 > Urban96
- Glitch in WVI?

