

# X-ray fluorescence with ANSTO libraries

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# EADL and ANSTO data libraries: Comparison

We are comparing Geant4 results using for

Geant4.10.05

- ionisation cross-sections:

- Based on Form Factor (Taborda K, L, M 2011-2013)
- ANSTO PIXE cross section (next public release)

- Transition probabilities:

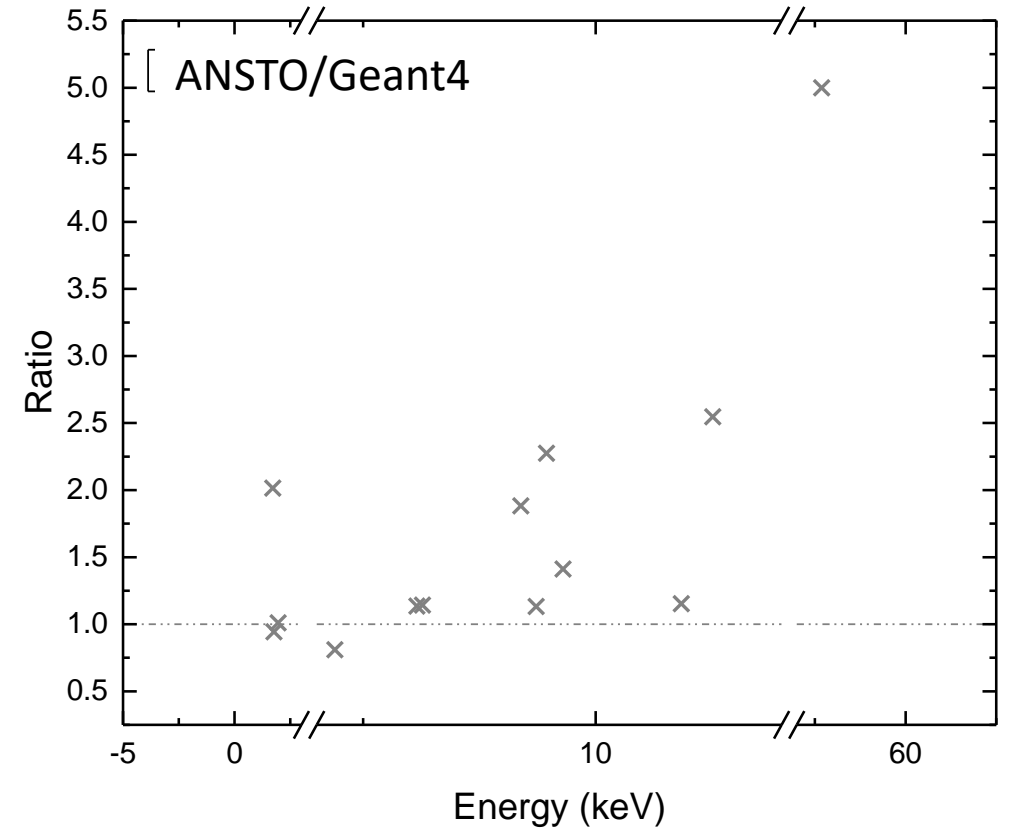
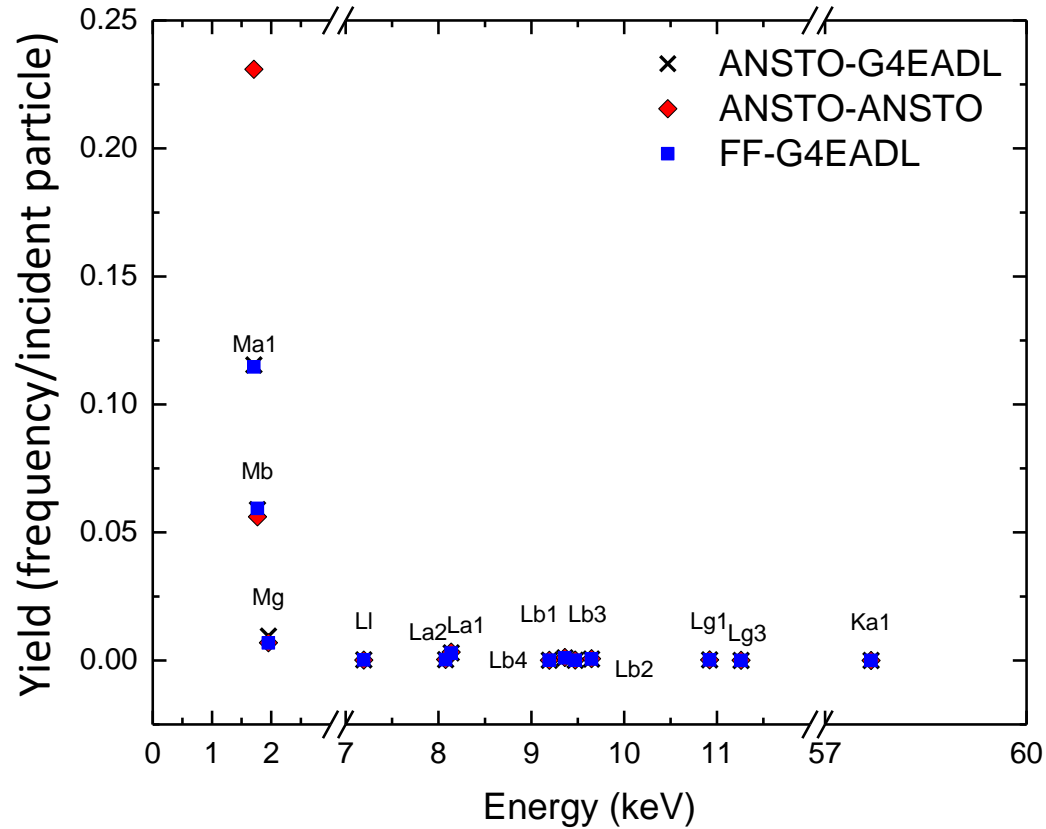
- EADL

- ANSTO-fluo

- D. D. Cohen, J. Crawford, and R. Siegele, “K, L, and M shell datasets for PIXE spectrum fitting and analysis,” Nucl. Instruments Methods Phys. Res. Sect. B Beam Interact. with Mater. Atoms, vol. 363, pp. 7–18, 2015.
- Data library of ANSTO with the same format of EADL (G4EMLOW7.7/fluo)
- The same binding energies of EADL are adopted
- The radiative transition probabilities reported in the EADL were calculated according to Hartree Slater (HS) methods, however [Cohen et al 2015] recommends the Hartree-Fock approach for M shell

# Results

# Ta - 2 MeV proton

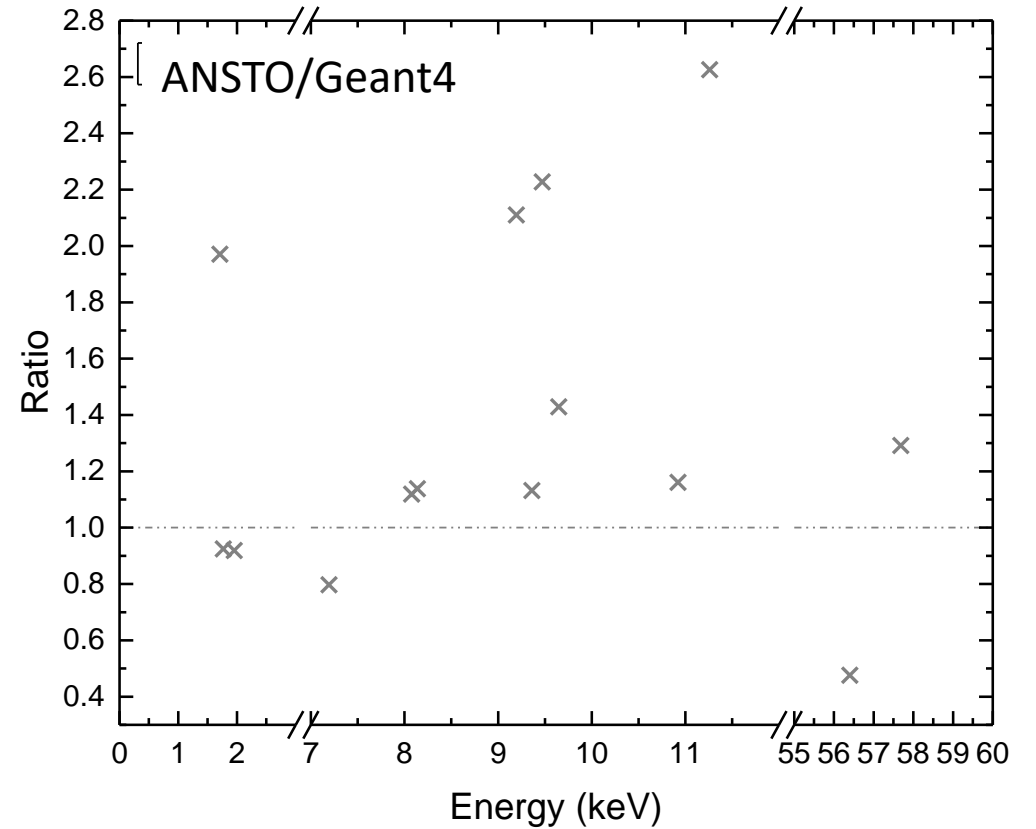
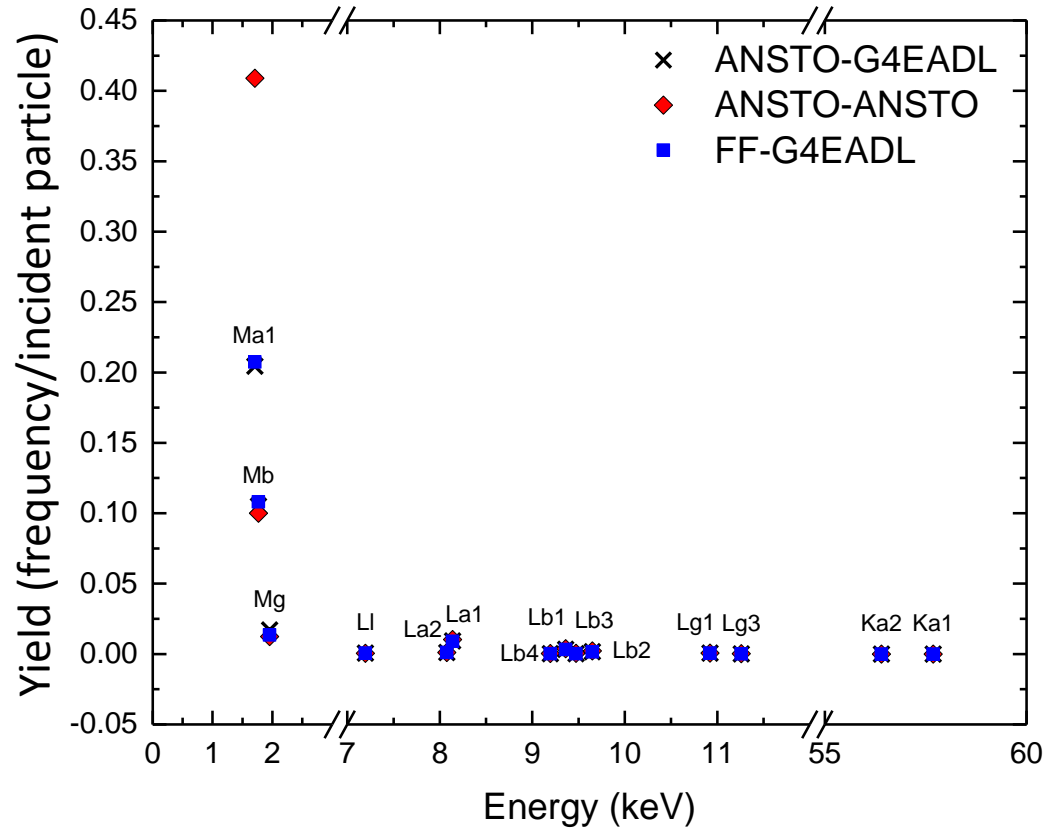


**ANSTO-ANSTO:** ANSTO cross section with ANSTO transition probabilities

**FF-G4EADL:** Form Factor cross sections with EADL (Geant4)

**ANSTO-G4EADL:** ANSTO cross sections with EADL

# Ta - 3 MeV proton

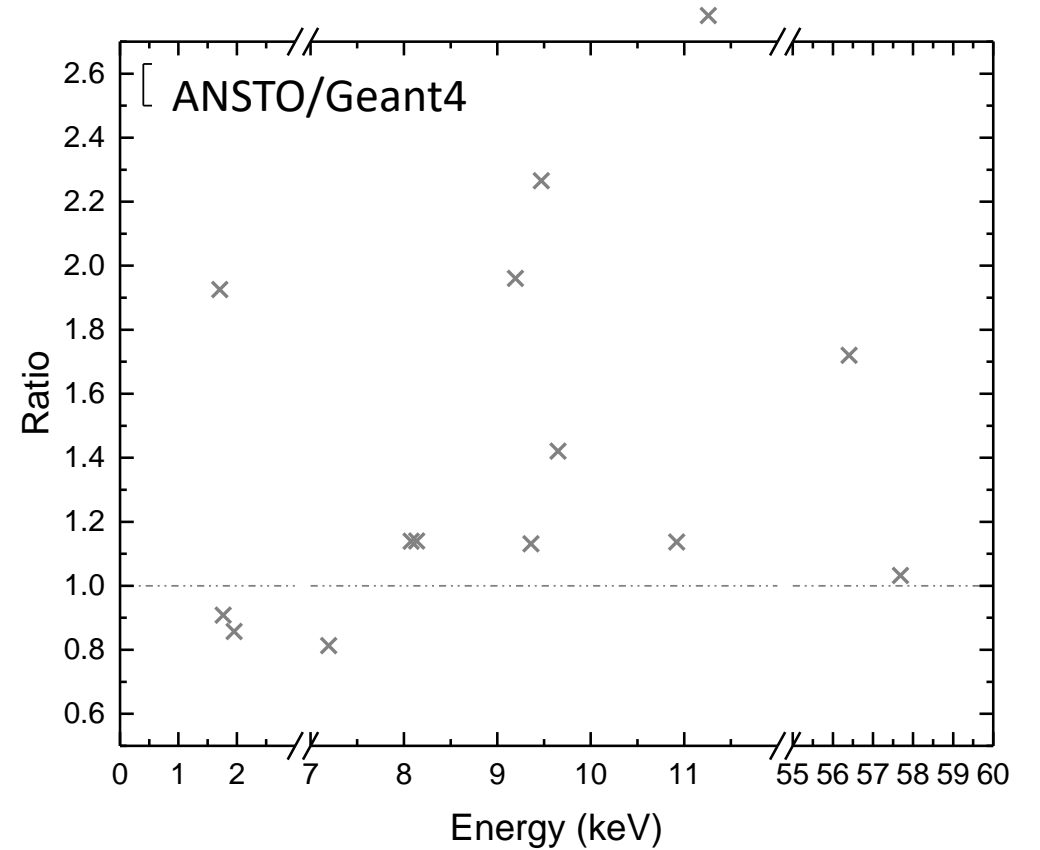
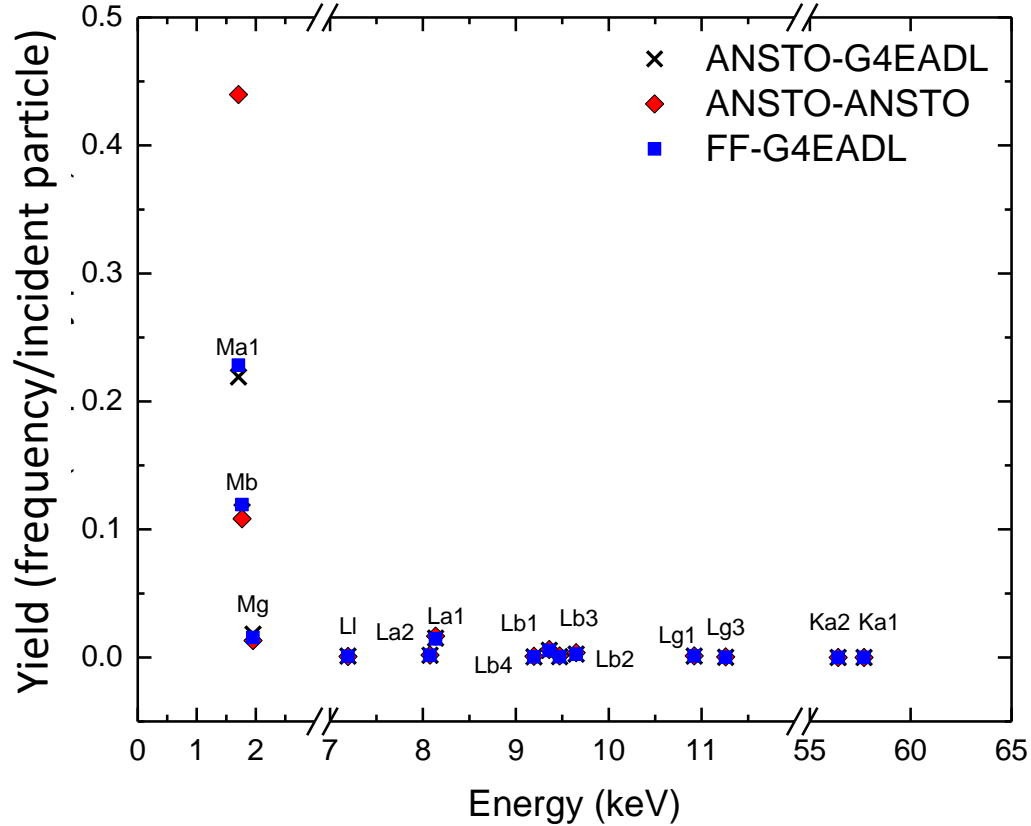


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# Ta-4 MeV proton

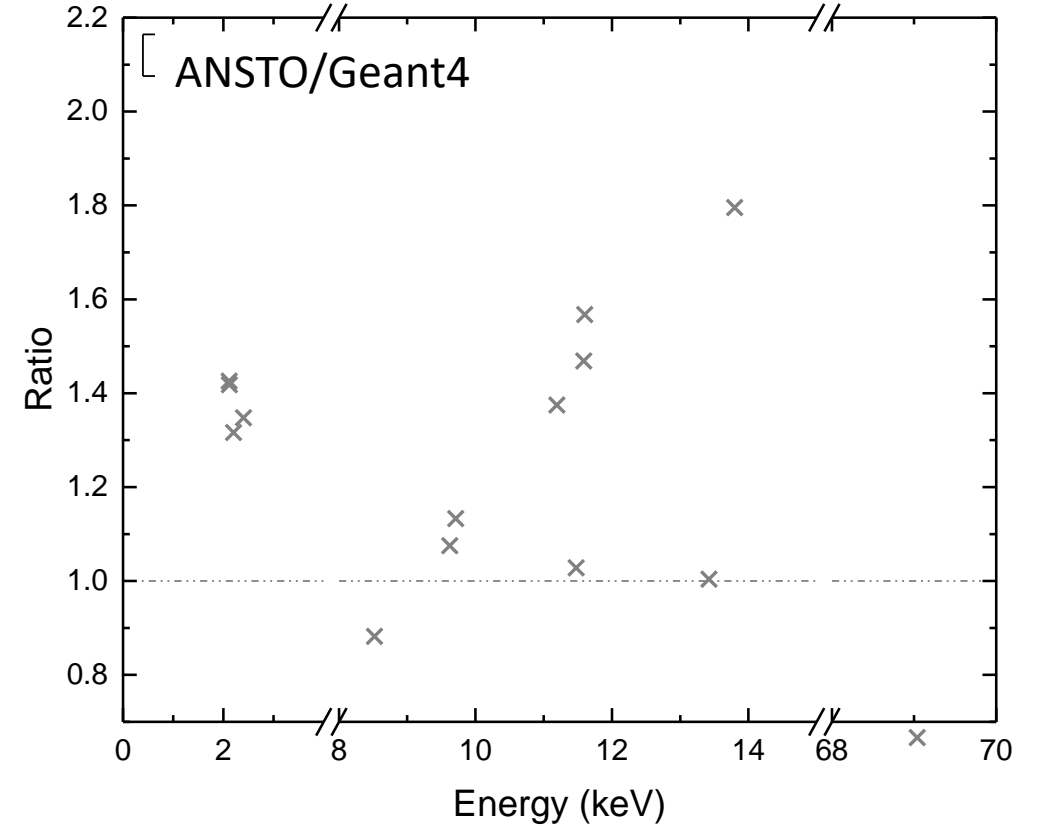
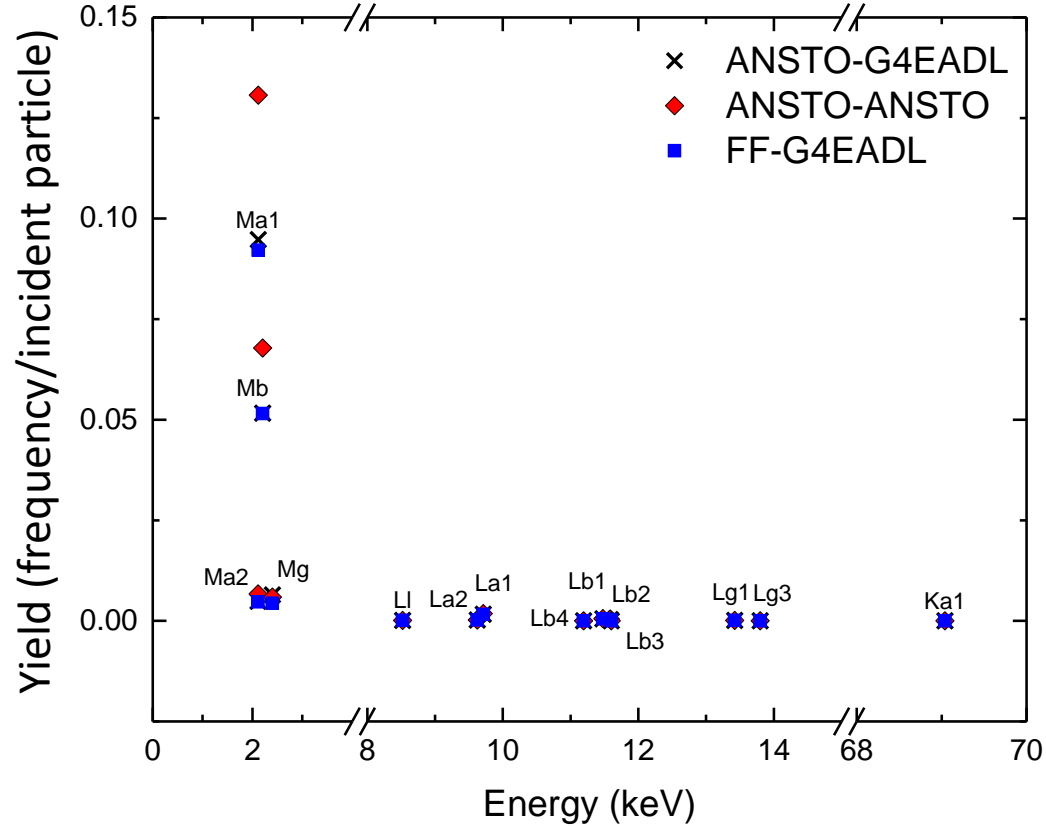


**ANSTO-ANSTO:** ANSTO cross section with ANSTO transition probabilities

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**ANSTO-G4EADL:** ANSTO cross sections with EADL

# Au - 2 MeV proton

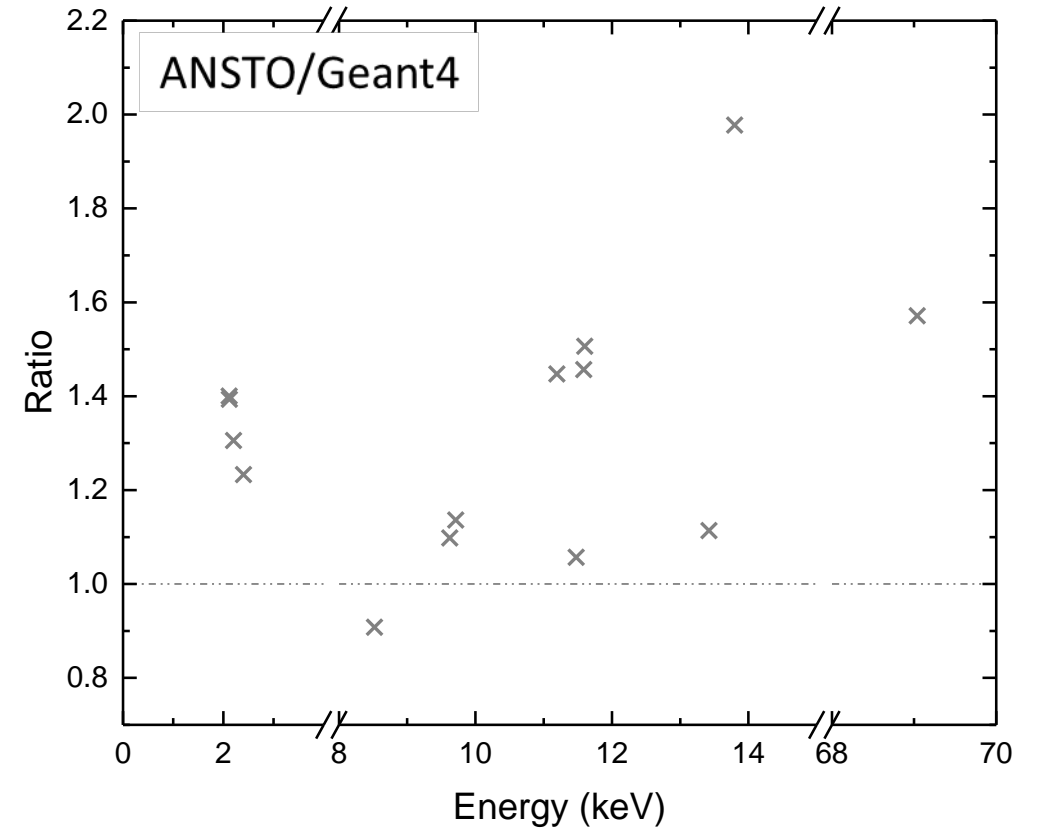
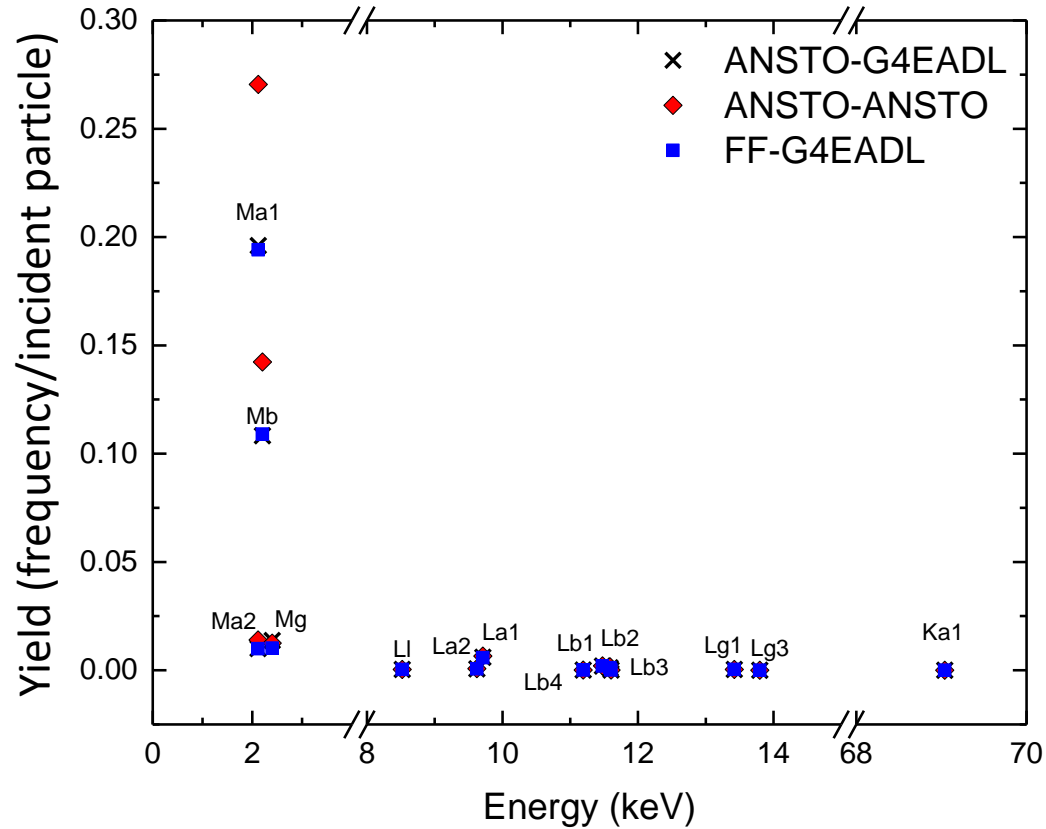


**ANSTO-ANSTO:** ANSTO cross section with ANSTO transition probabilities

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**ANSTO-G4EADL:** ANSTO cross sections with EADL

# Au - 3 MeV proton



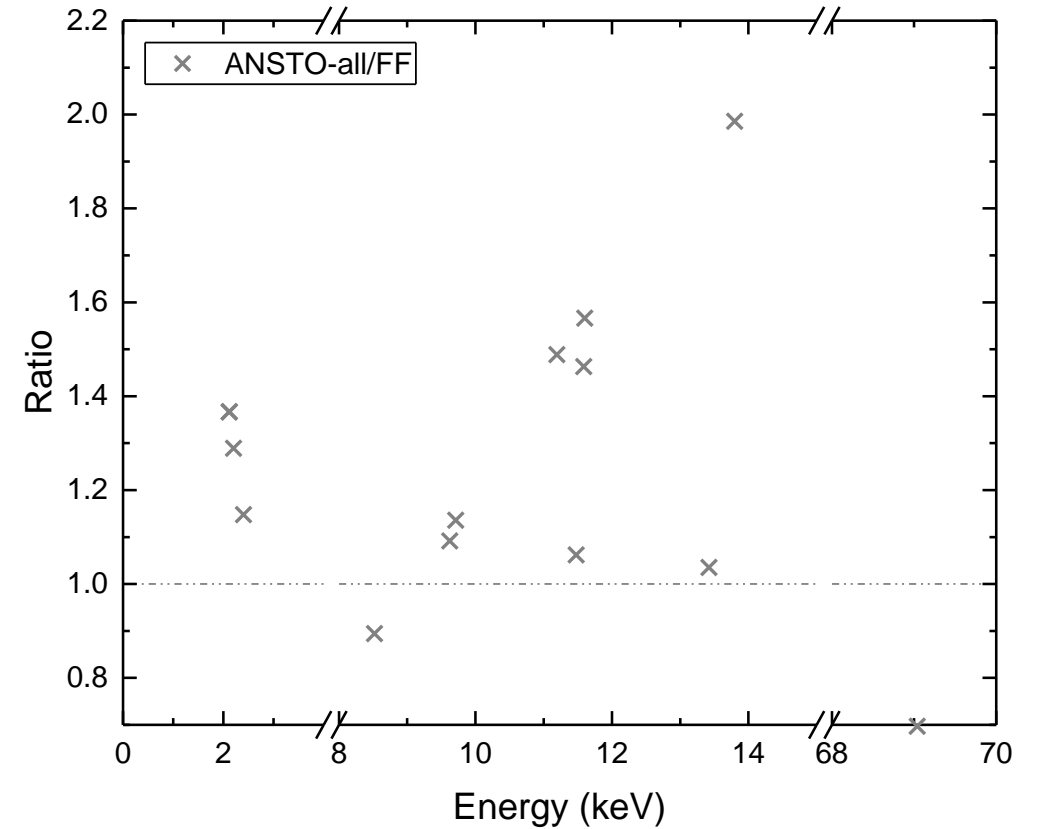
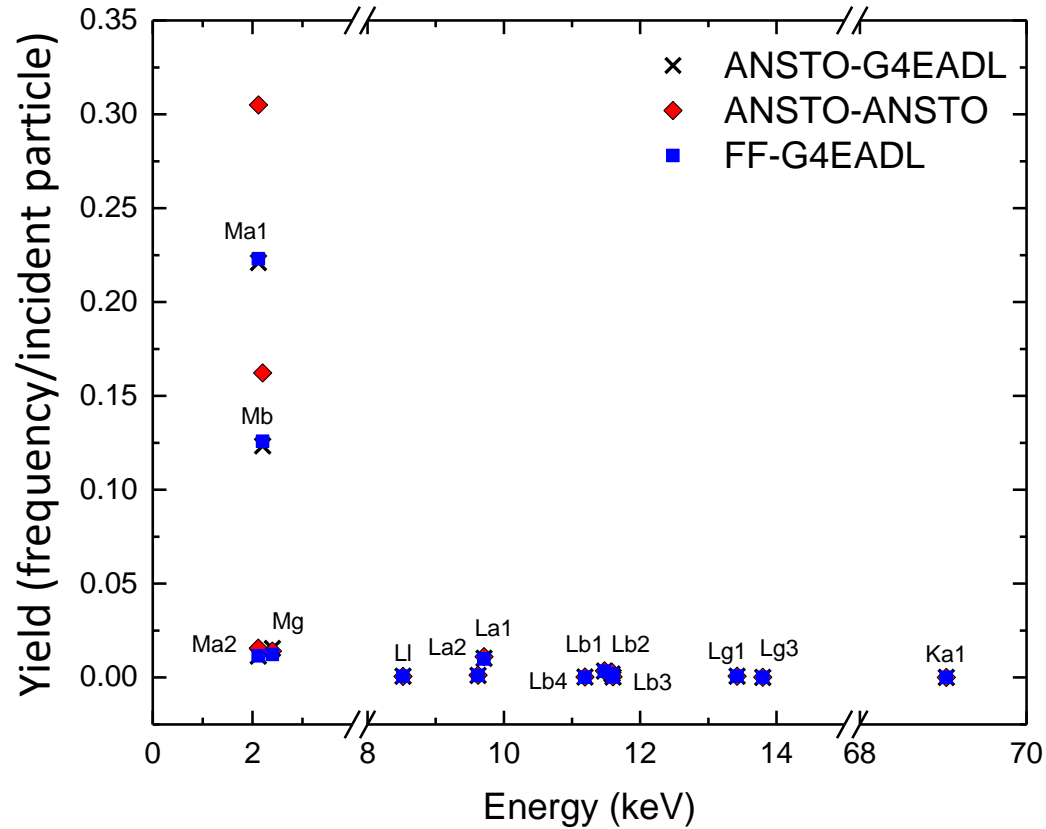
**ANSTO-ANSTO:** ANSTO cross section with ANSTO transition probabilities

**FF-G4EADL:** Form Factor cross sections with EADL (Geant4)

**ANSTO-G4EADL:** ANSTO cross sections with EADL



# Au - 4 MeV proton



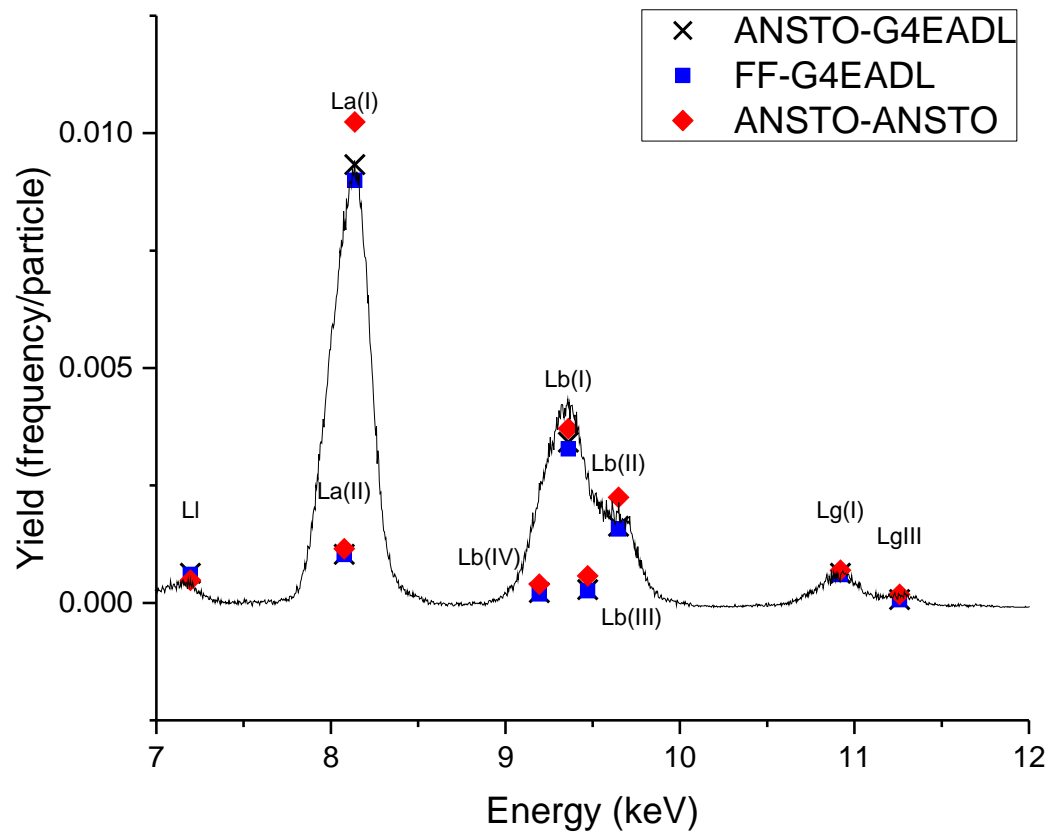
**ANSTO-ANSTO:** ANSTO cross section with ANSTO transition probabilities

**FF-G4EADL:** Form Factor cross sections with EADL (Geant4)

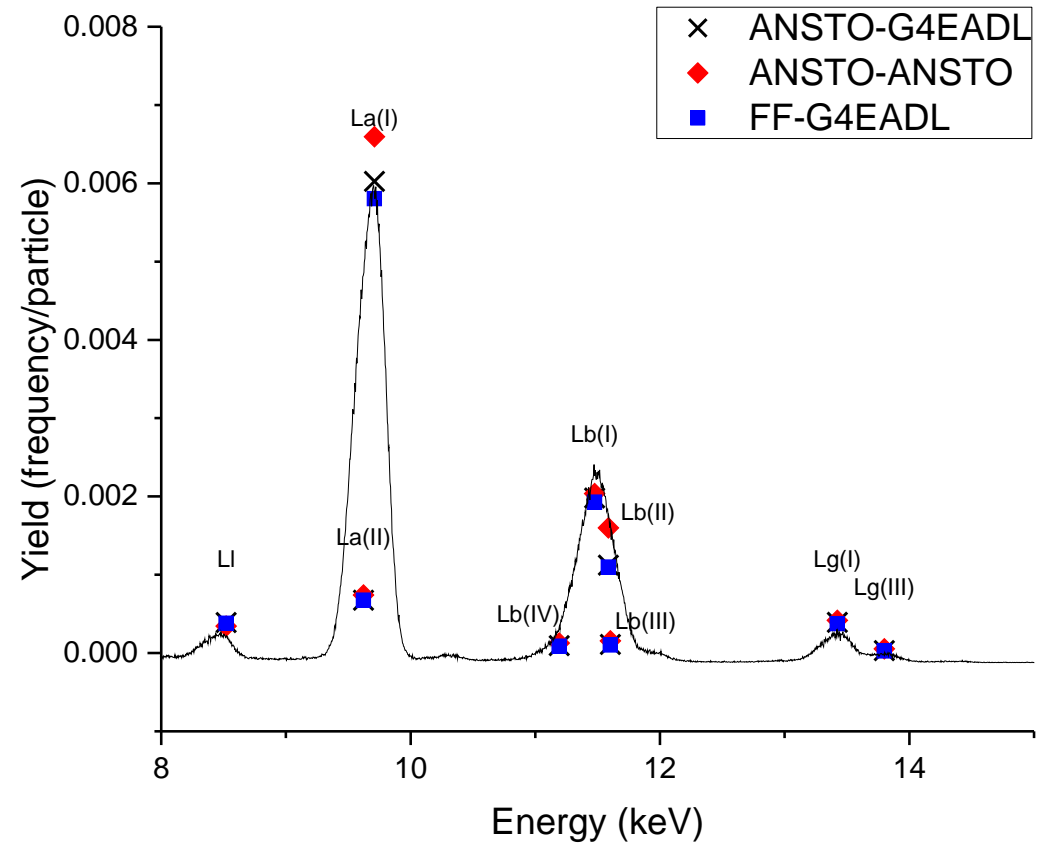
**ANSTO-G4EADL:** ANSTO cross sections with EADL

# Comparison against experimental data

Ta-3 MeV proton



Au-3 MeV proton



# Summary

- Work in progress
- Compare ANSTO data library against Geant4 (FF and EADL) for low, medium and high Z materials
- We continue the comparisons against experimental measurements