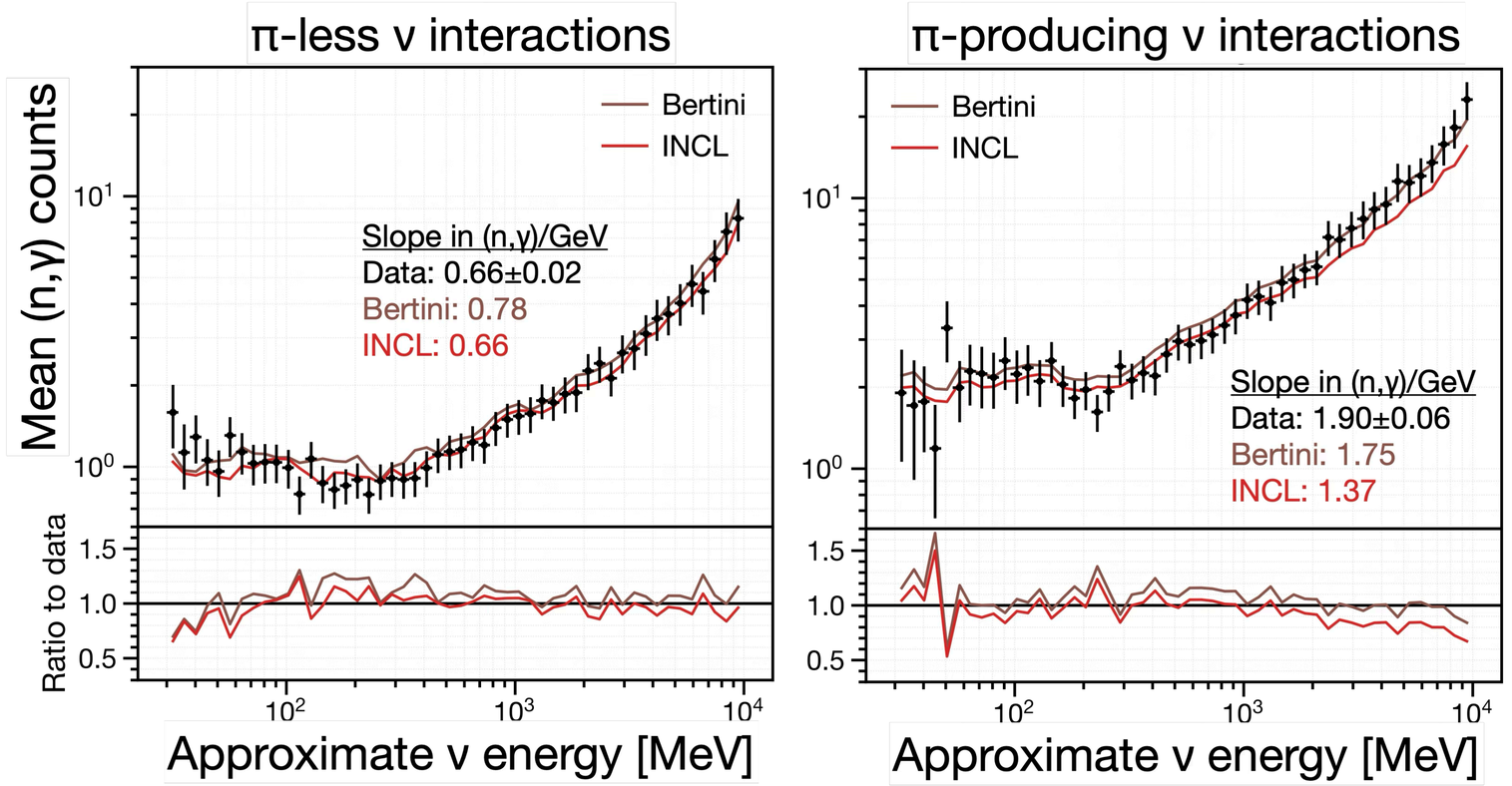


We measured “total (n,γ) counts” following neutrino interactions in water

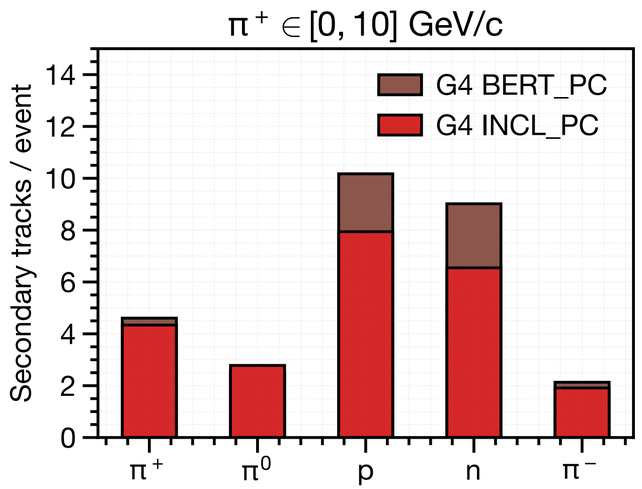
Geant4 INCL++ works well for events without π production
but start to deviate for multi-GeV π-producing events

We would like to ask for expert opinion on why this happens.

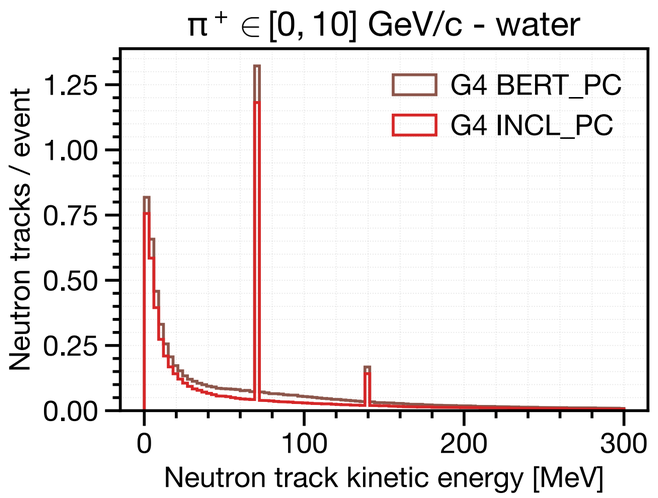
Test with Geant4.10.5.p01:

100k π+ with kinetic energy random in [0, 10] GeV propagates through water

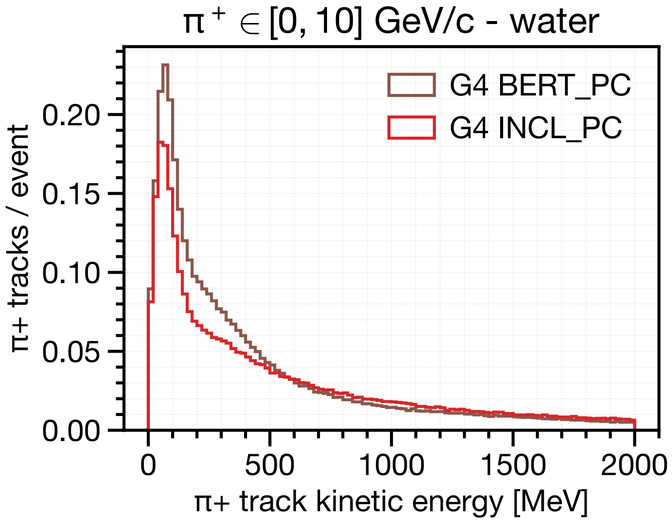
Total track counts



Secondary n KE



Secondary π+ KE



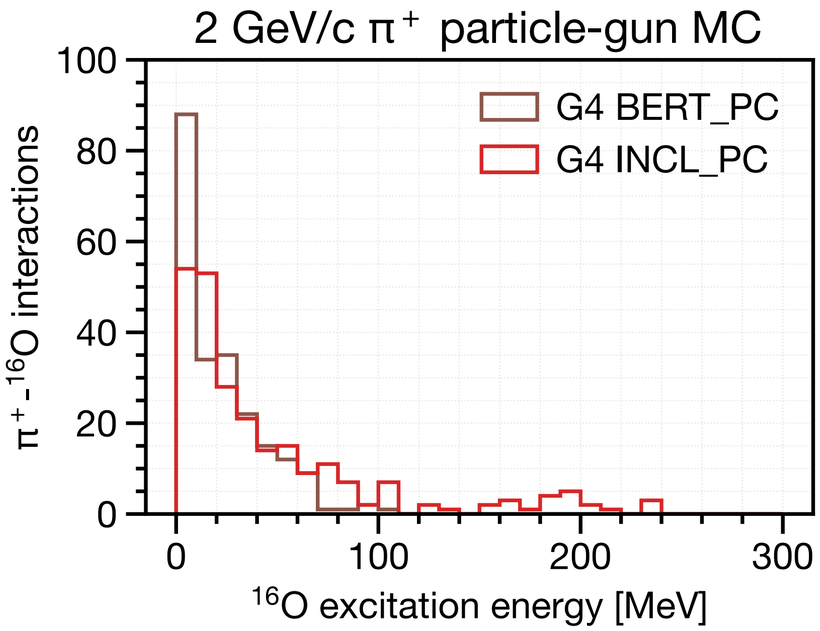
Fewer n through de-excitation in INCL?

Fewer low-E π in INCL

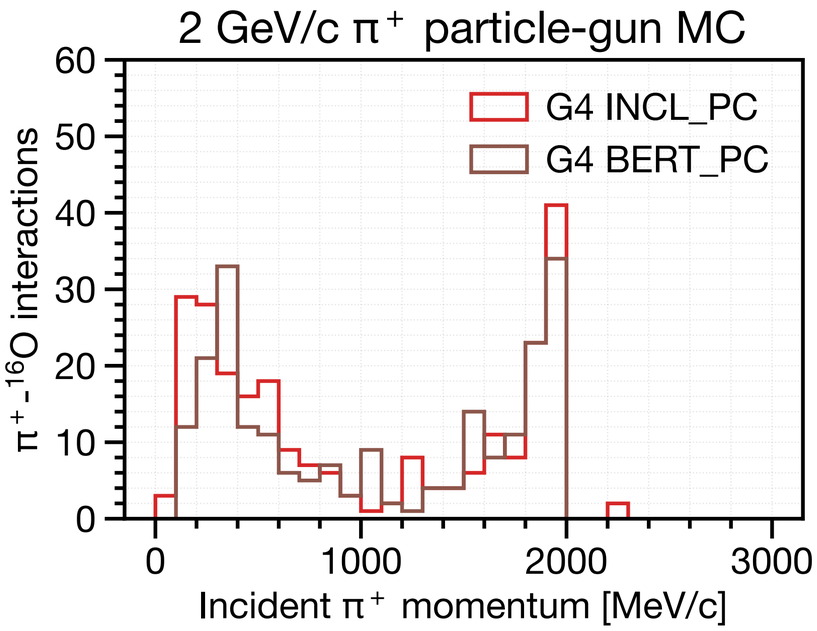
Geant4.10.5.p01

100 π+ with momentum 2 GeV/c propagates through water

16O excitation energy after π+ cascade



Incident π+ momentum



Bertini: many events with E_ex=0

INCL: long tail

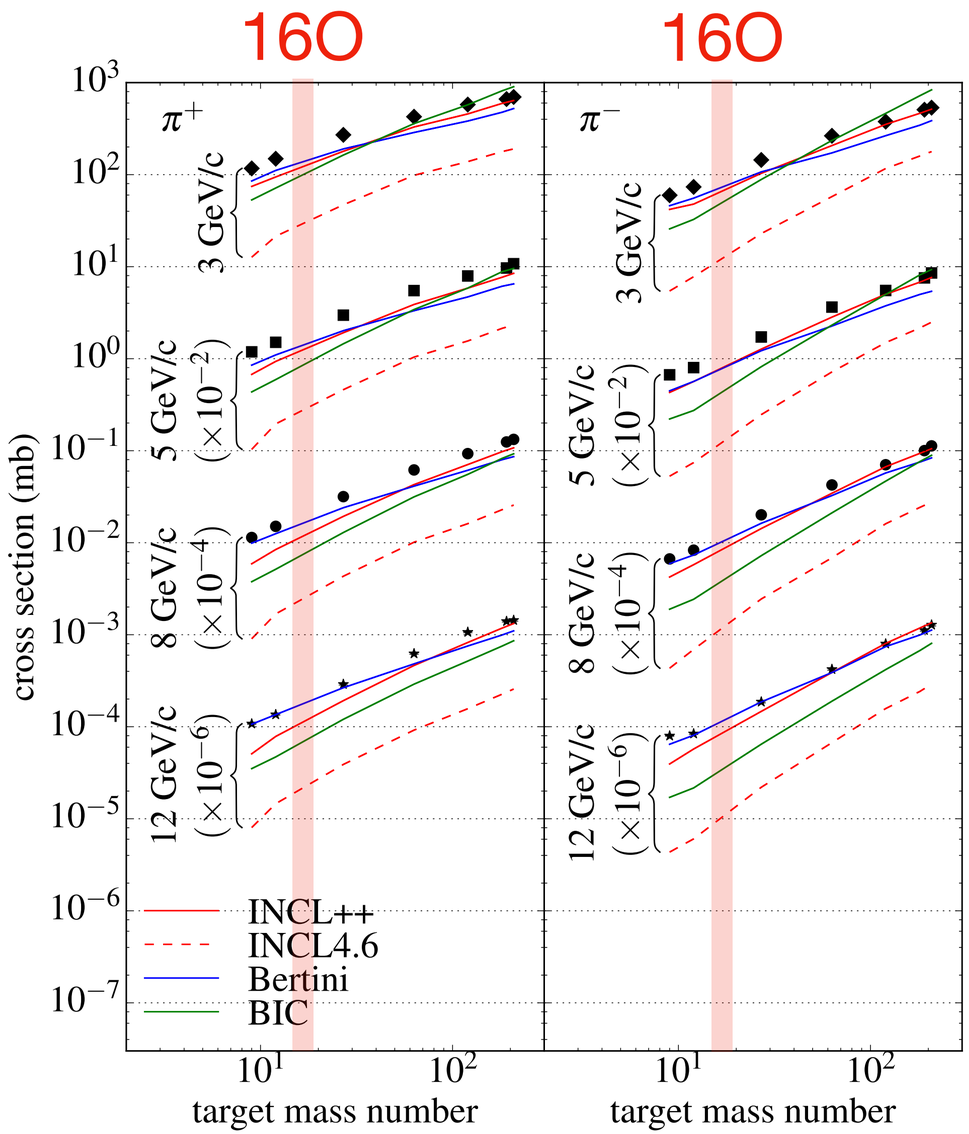


Figure 4. Same as Fig. 3, but for π^+-nucleus reactions.

Bertini predicts slightly
larger inclusive π production xsec
for lighter nuclei?

D. Mancusi et al. On the role of secondary pions in spallation targets
https://arxiv.org/abs/1603.05453