

Using carbon data for dilution/packing fraction extraction

Moshe Friedman

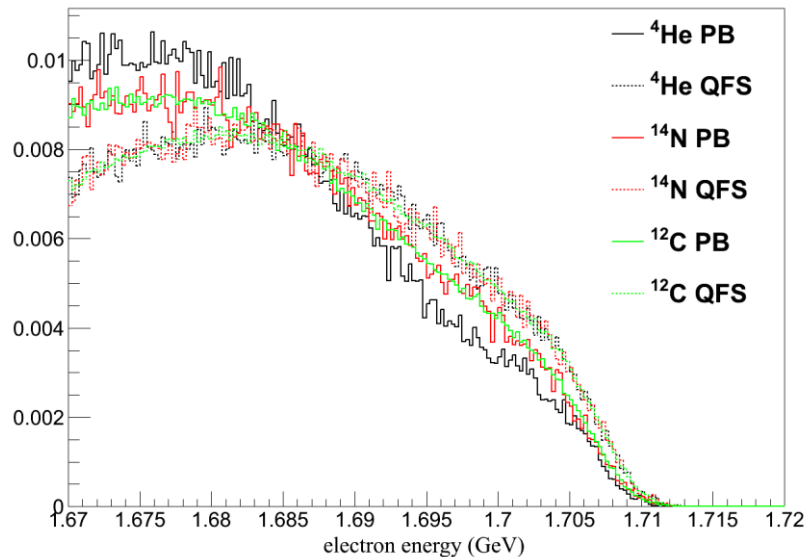
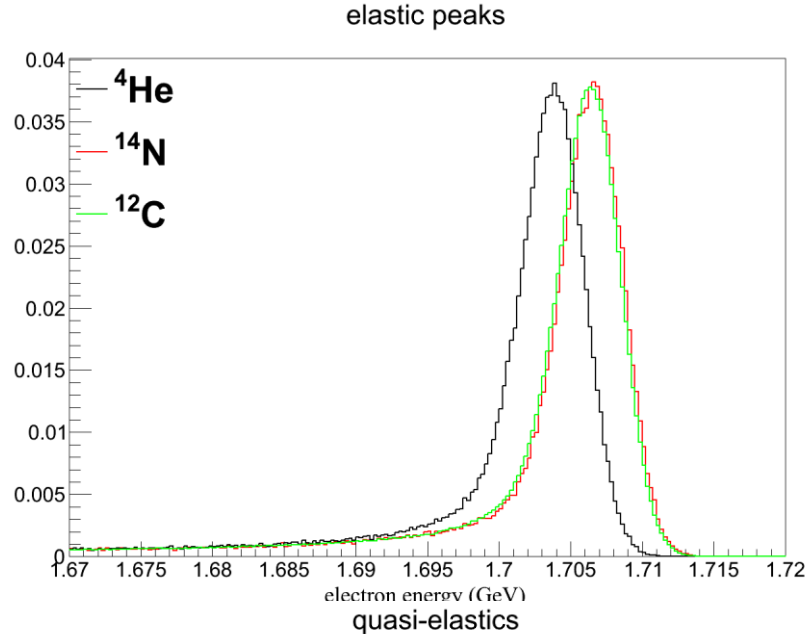
g2p analysis meeting
Aug 27, 14

Problem: GEp must have accurate dilution factor at the hydrogen-elastic energies range. This is not easy to achieve, since we do not have good enough models, and (almost) no experimental data, for nitrogen and helium contribution at the quasi-elastic peak.

Solution 1: Use Vince's data, if accuracy is good enough, and if we are able to interpolate/extrapolate to different kinematics and cuts. (Will be possible if PB or QFS are scalable with data).

Solution 2: Use scaled carbon data, IF it is possible to scale carbon data to nitrogen (at the quasi-elastic peak).

simulations



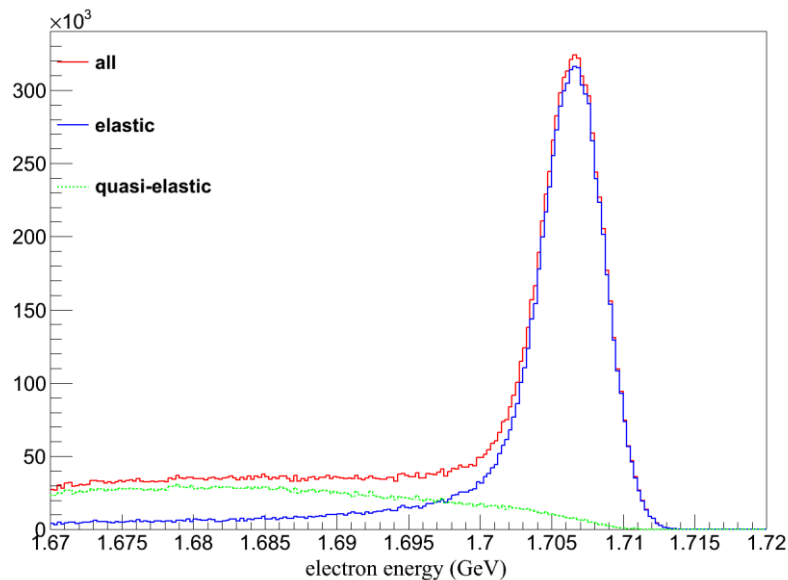
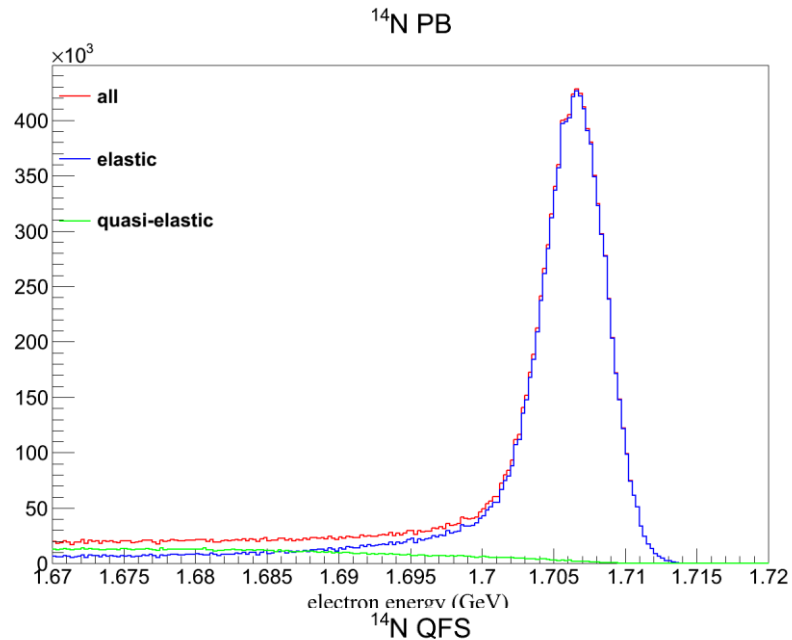
- Each curve is normalized to integral of 1. We compare only the shape here.

- Although elastic peaks are centered around slightly different energies, quasi-elastic peaks are at the same position.

- In Bosted model, C and N quasi-elastics are scalable, while in QFS also He is scalable.

- Hydrogen elastics:
~1.687-1.697 GeV

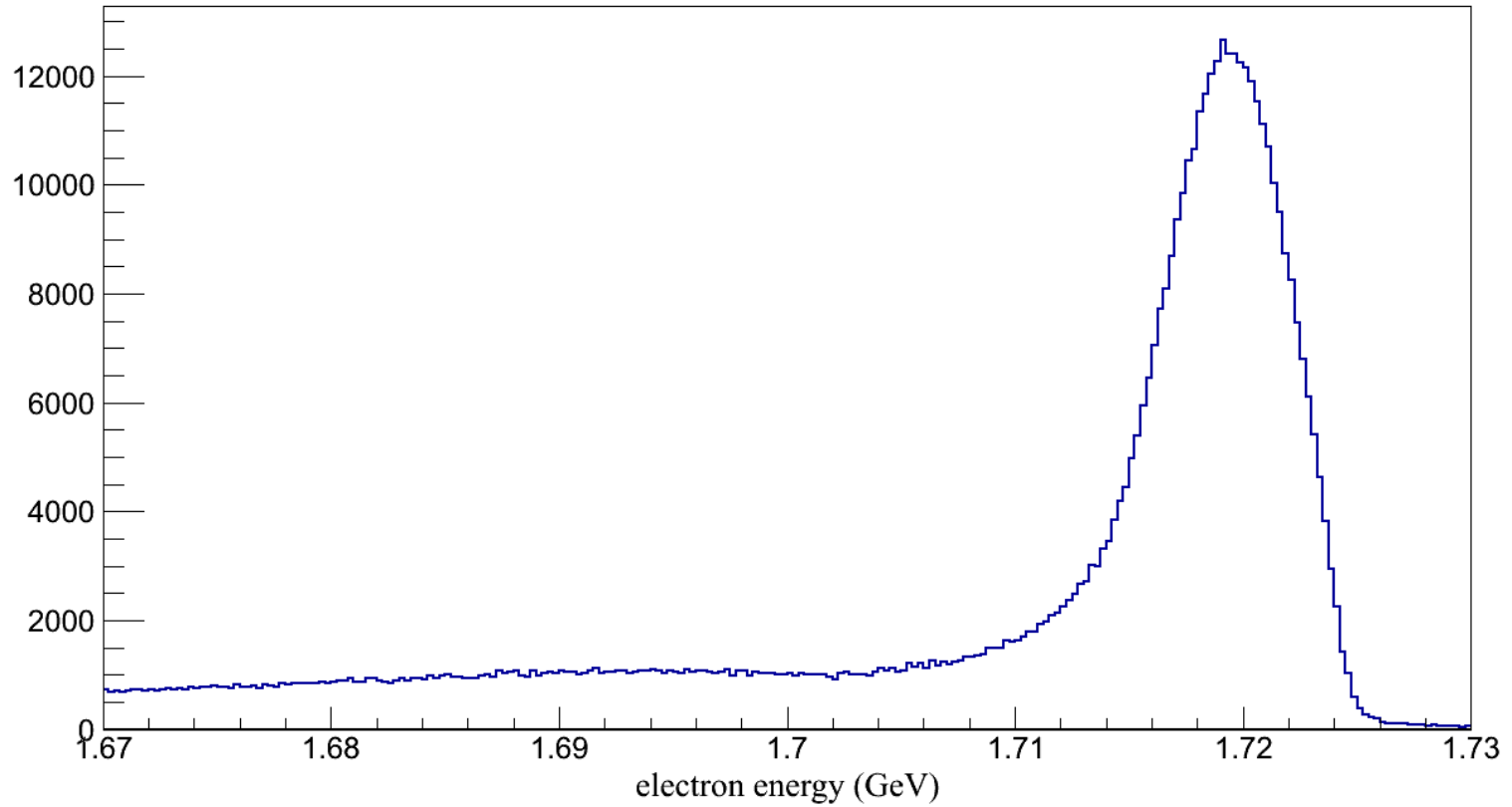
simulations



- Still need to understand the ratio between elastic and quasi-elastic strength - might be incorrect.
- However, all simulations were done in the same way, so it shouldn't be critical for this purpose.
- Pay attention to energy scale, which makes quasi-elastic peak looks smeared.

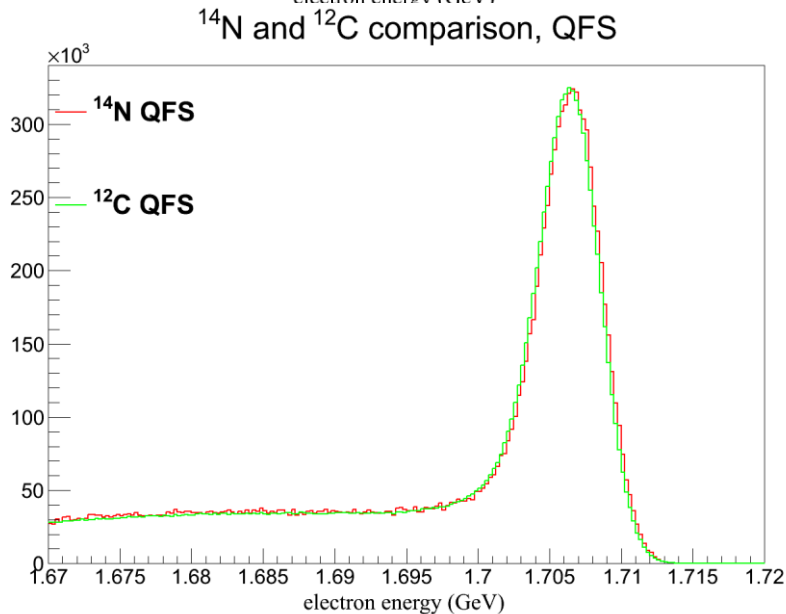
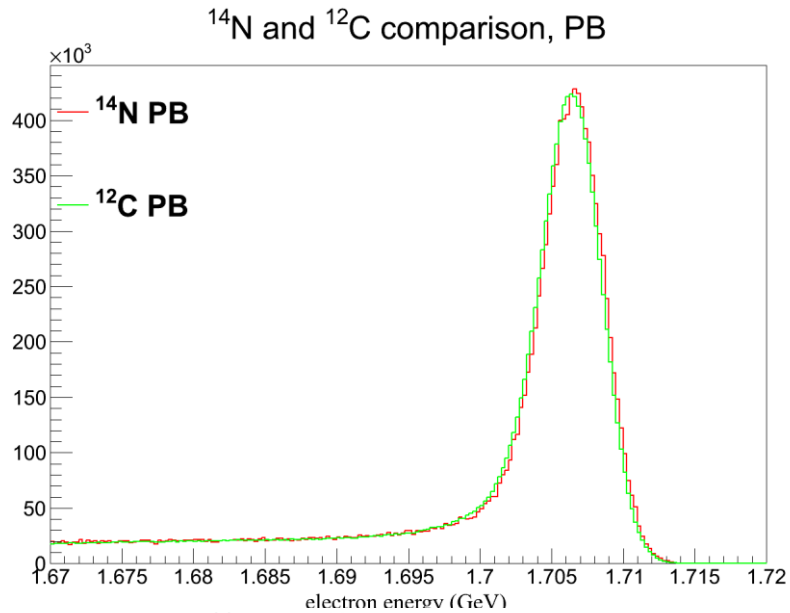
data

run 4623, ${}^4\text{He}+{}^{12}\text{C}$, 1.7 GeV



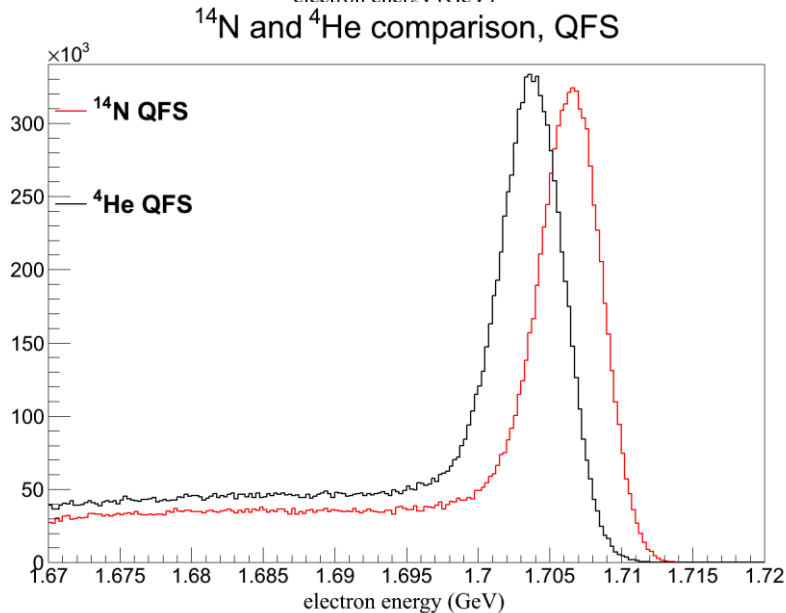
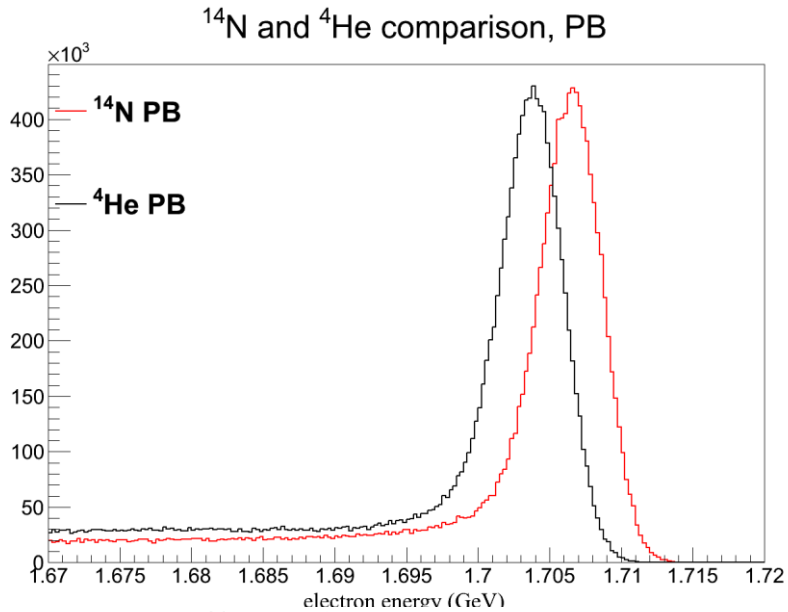
Note: momentum reconstruction with old optics

simulations – scaling C and N data



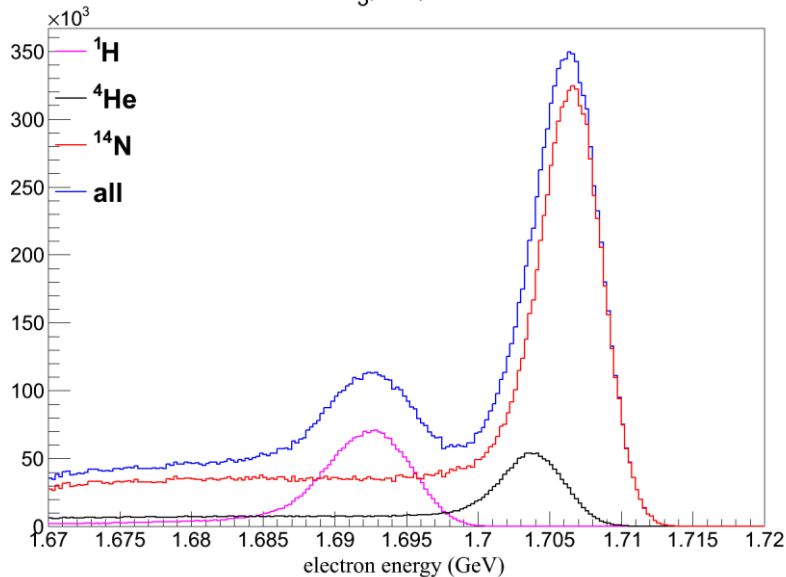
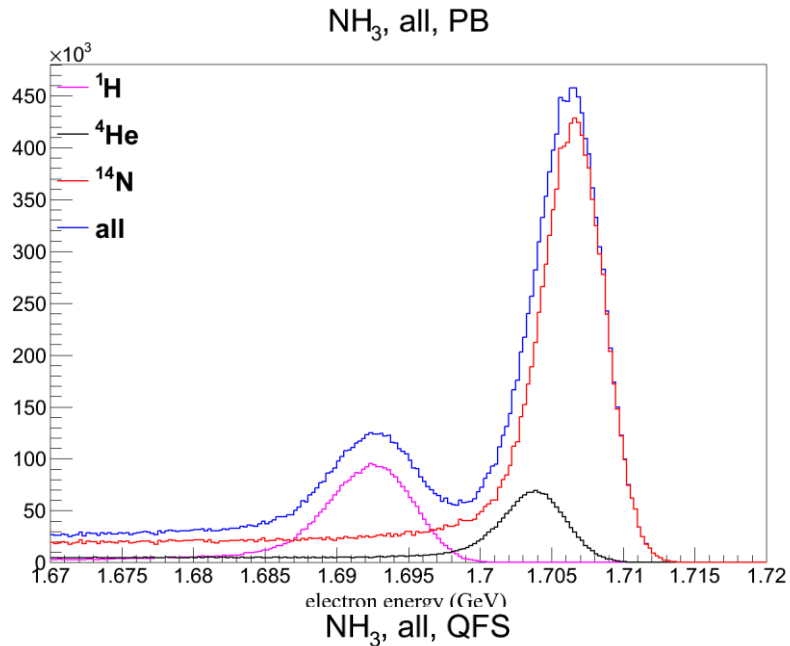
- data is normalized to the same number of elastic events for C and N – not trivial to do with exp. data.
- In both models, this scaling makes perfect match at the quasi-elastic area.

simulations – scaling He and N data



- data is normalized to the same number of elastic events for He and N – not trivial to do with exp. data.
- In both models, this scaling is significantly off.

simulations – relative contributions



- packing fraction is 0.50 for both simulations. He contribution outside the target is not taken into account.

- In both models, He contribution is relatively low.

To do:

- Check, in simulation, if possible to scale LH+NH₃ runs with carbon runs, and with carbon + LH runs.
- Repeat with g2psim.
- Any suggestions?