

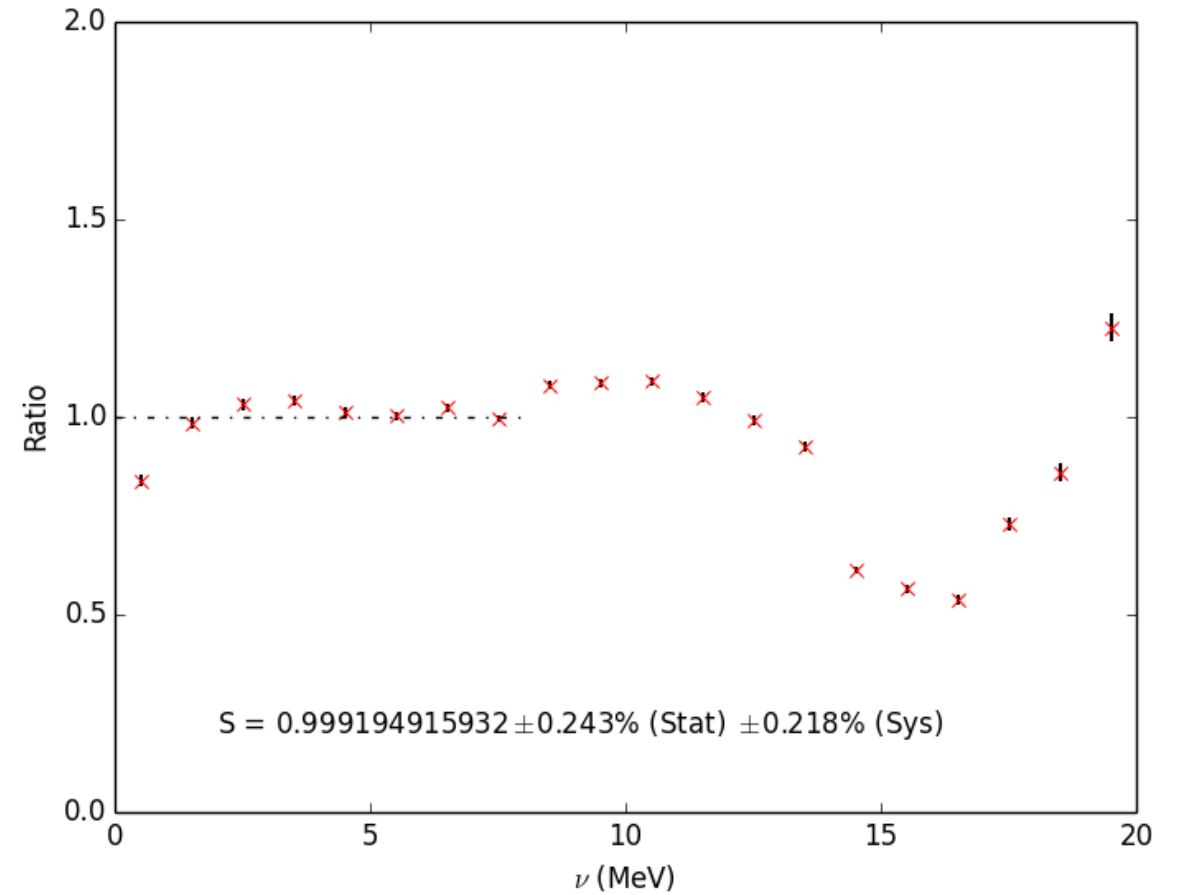
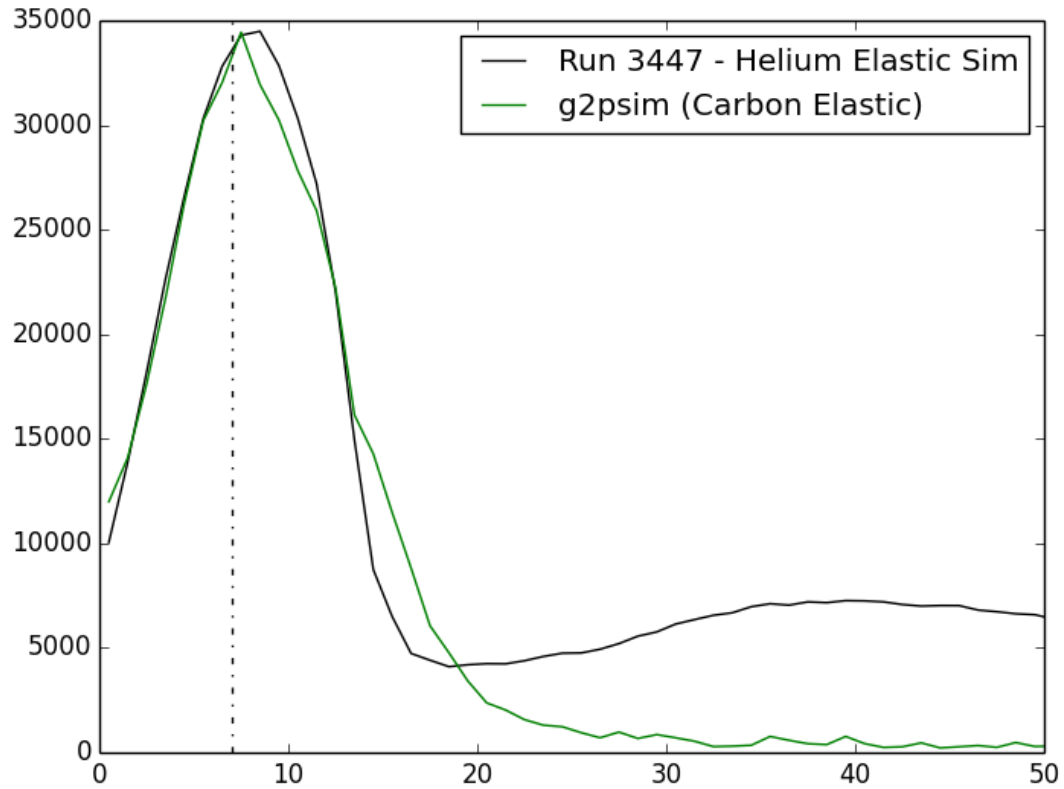
# 2.5T Packing Fraction Update

David Ruth

# Carbon Simulation agrees well for dilution run

- Chao pointed out error that led to simulated Helium peak being offset from where it was supposed to be
- Also fixed small unit error in the bpm that smoothed out peak
- To compare only Carbon to Carbon simulation, instead of doing a fit to the Helium peak (since is not clearly defined in the Dilution data), we subtract the simulated Helium elastic peak from the production data instead of adding it to the simulated Carbon elastic peak.
- Since it has a known packing fraction, this works relatively well
- Take weighted average of resulting ratio

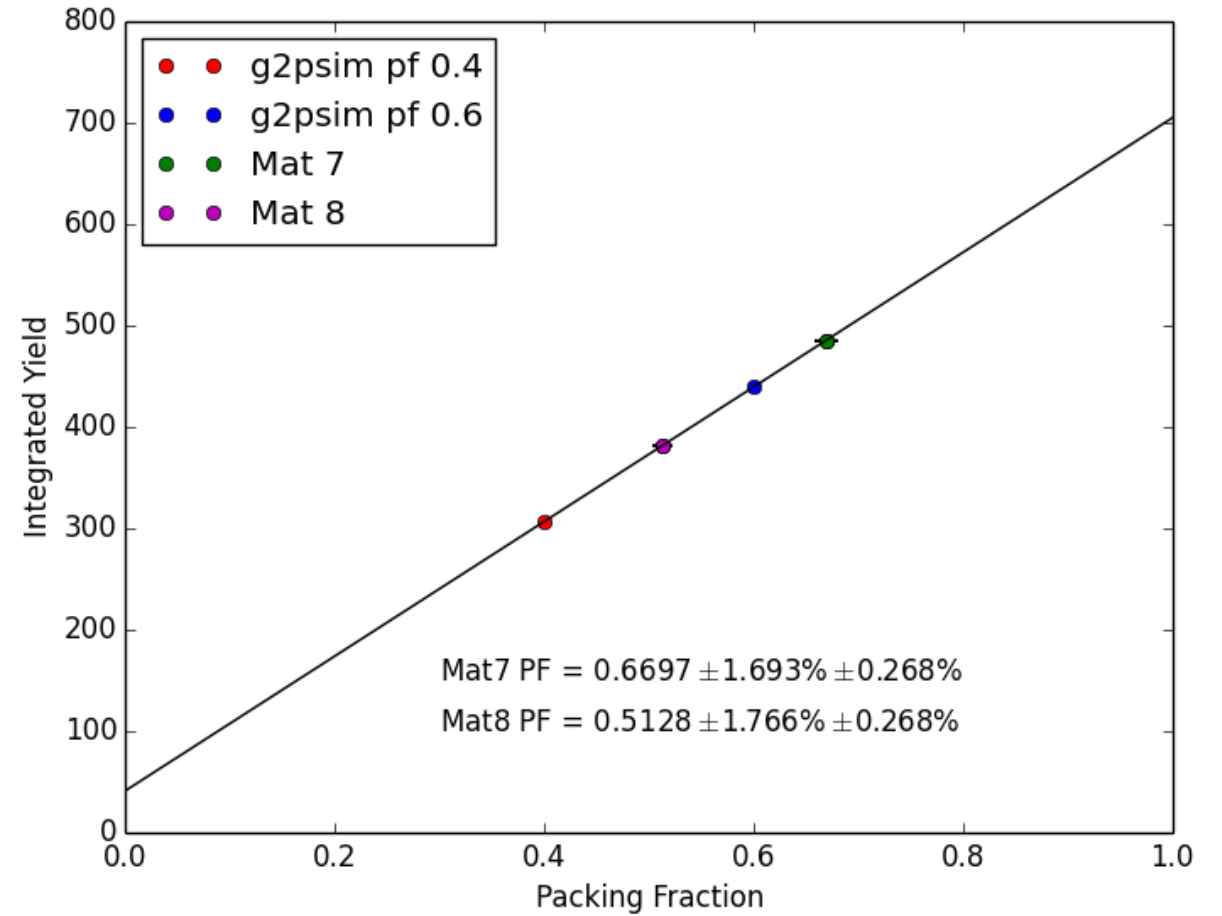
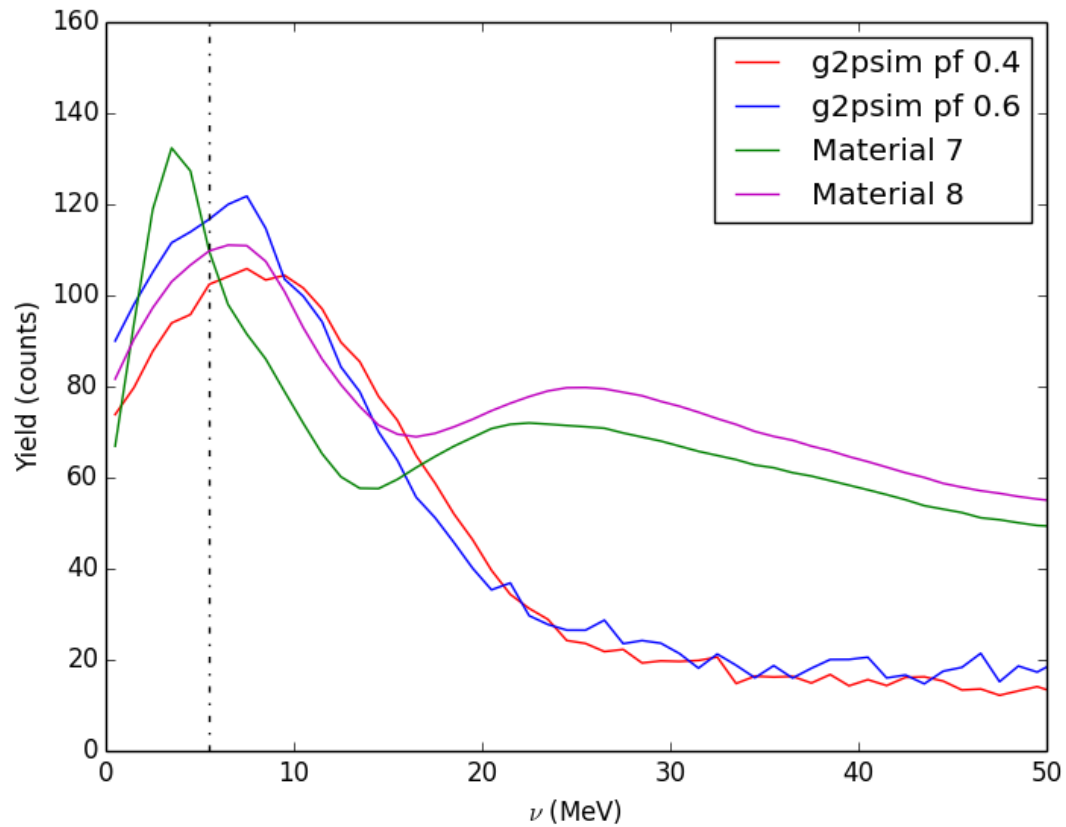
# Carbon Simulation agrees well for dilution run



# For production data, similar method used iteratively

- $Y_{\text{prod}} = Y_{\text{N}} + (1-\text{pf})Y_{\text{He(sim)}}$
- For Carbon, we knew the pf, so we could subtract out the simulated Helium, but here, we do not know the pf
- However, subtracting 1.0 \* the simulated He yield versus subtracting nothing showed only a 9% difference in the resulting packing fraction
- Iterated over this process: guess a packing fraction of 0.5, subtract out 0.5 times the Helium yield, get a packing fraction of 0.61 (e.g.), make new guess for He pf be 0.39, repeat 10 times until result is stable.
- Showed no sensitivity to initial conditions, guess of 0.4, 0.5, and 0.6 produced same final pf

# Production data iterated to find pf



# What errors are associated with model?

## Statistical

Carbon Data	0.24%
Material 7 Data	1.18%
Material 8 Data	1.26%
Mat 7 Total	1.69%
Mat 8 Total	1.77%

## Systematic Statistical

Carbon Sim	0.22%
pf4 Sim	0.11%
pf6 Sim	0.11%
Mat 7 Total	0.27%
Mat 8 Total	0.27%