John P. Update

9/20/19

Reviewing Nicole's Code

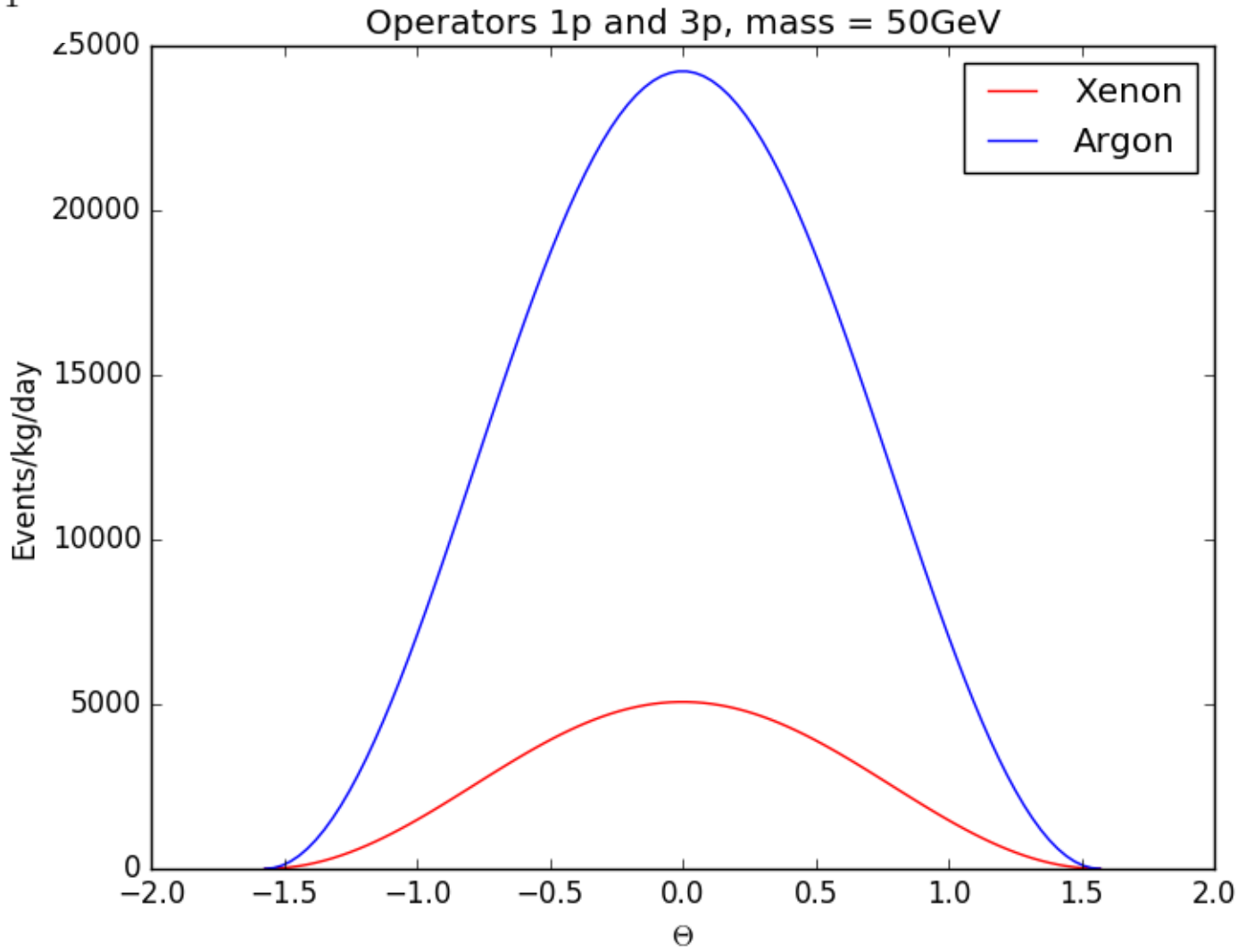
- Looked through the piece of code Nicole uses to obtain differential event rates.
- Saw no obvious bugs or issues in the program.
- The way she obtains operator form factors from nuclear form factors is consistent with what the Mathematica package does.
- The way she obtains the differential event rate from the operator form factors also looks good.

Things still left mysterious

- **How is she defining her nuclear form factors?**
- I think there is probably some disagreement in nuclear form factor definitions. This is due to there being disagreements in interferences (which are vel dist. independent) as well as in the differential spectra.
- **Where is the code she uses to calculate her velocity integrals?**
- This could cause some difference in spectrum shape. However, the fact that some spectra agree well and others don’t indicates to me that form factor disagreements are likely a bigger issue.
- **Where is the code she used to calculate interferences?**

$$\mathcal{O}_3 = i\vec{S}_N \cdot (\vec{q} \times \vec{v}^{\perp})$$

$$\mathcal{O}_1 = 1$$



Argon Density Matrices

- Talked with Changfeng, who said the Matrix elements I have for Argon 36 look OK.
- Also talked to Calvin, who said he wasn’t sure what was causing the discrepancy.
- Calvin also said that the density matrix elements for Argon probably don’t include the 16O core, which would mean some nucleons aren’t accounted for.

In the near future

- Learn some nuclear physics and get a better understanding of how the density matrix elements are calculated.
- Get the matrix elements for Fluorine 19 calculated by Calvin’s bigstick code, compare to what’s in the Mathematica package.
- Try to get the missing pieces of Nicole’s code.