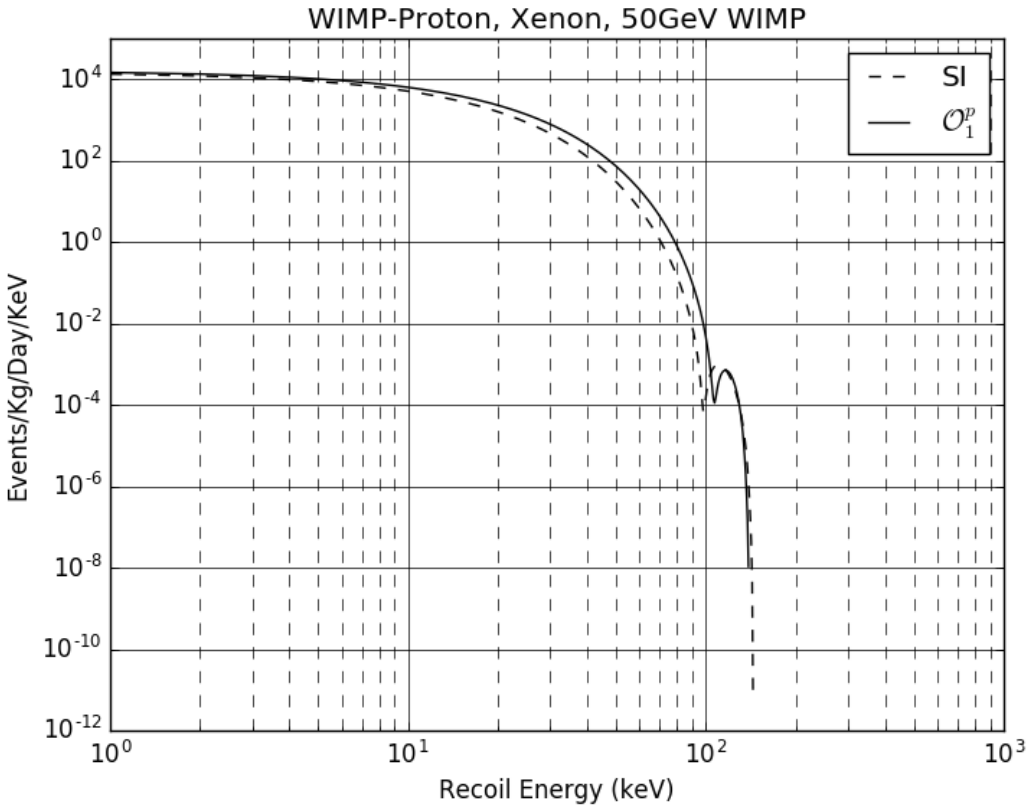
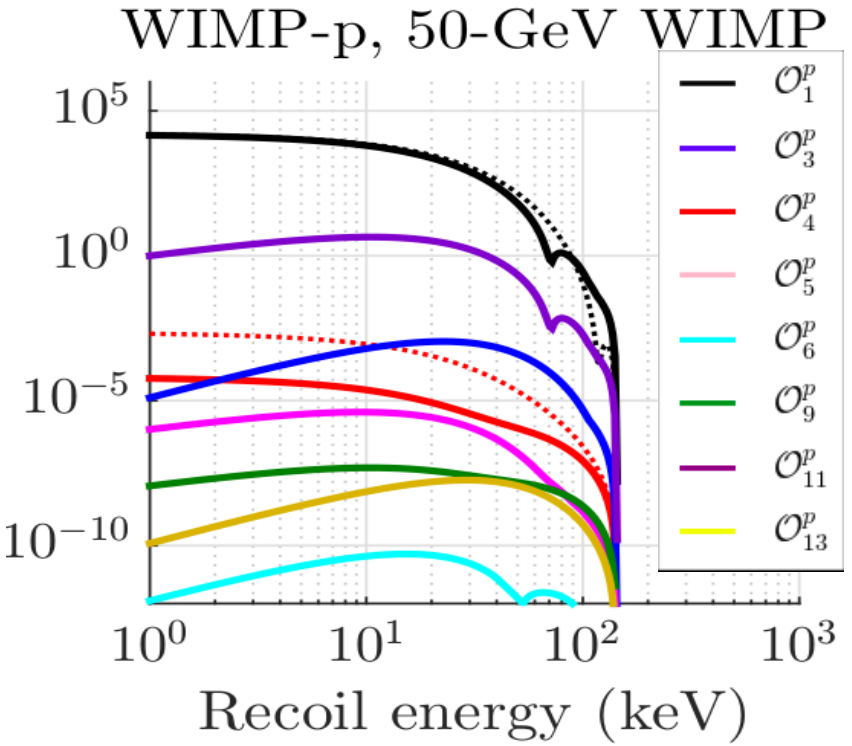
# John P Update

9/27/19

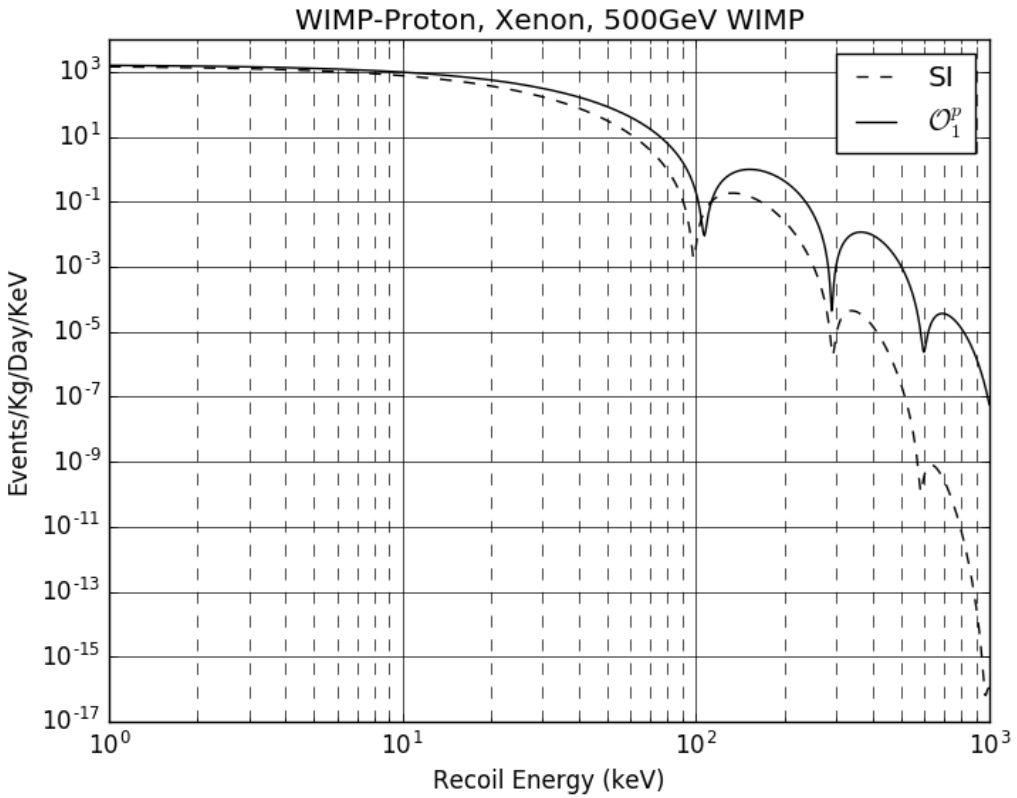
# SI Spectra

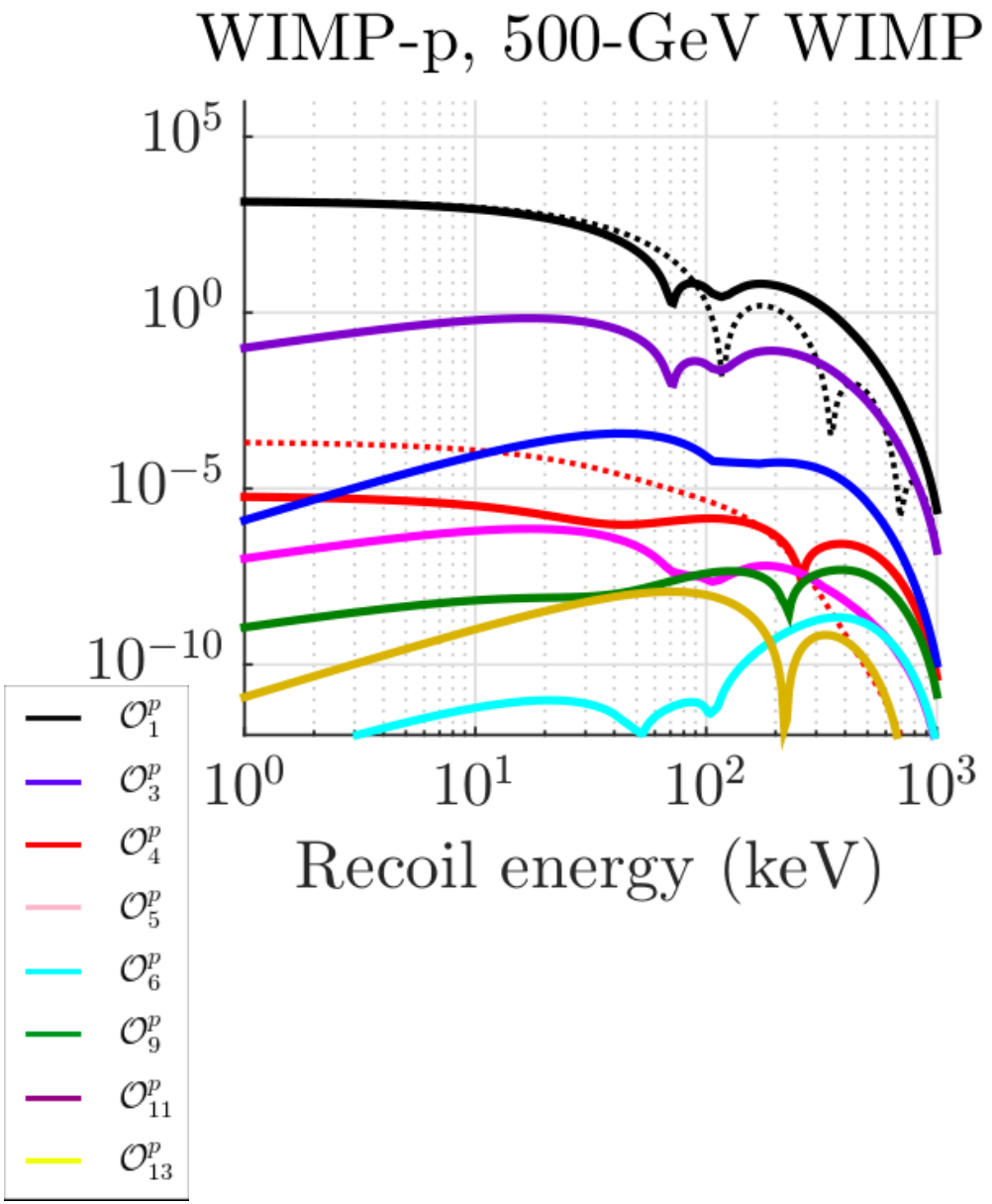
- Generated standard SI spectra using the Mathematica package
- Results are equally as lumpy as operator 1 spectra generated by Mathematica code, although the shapes of the curves are somewhat different.

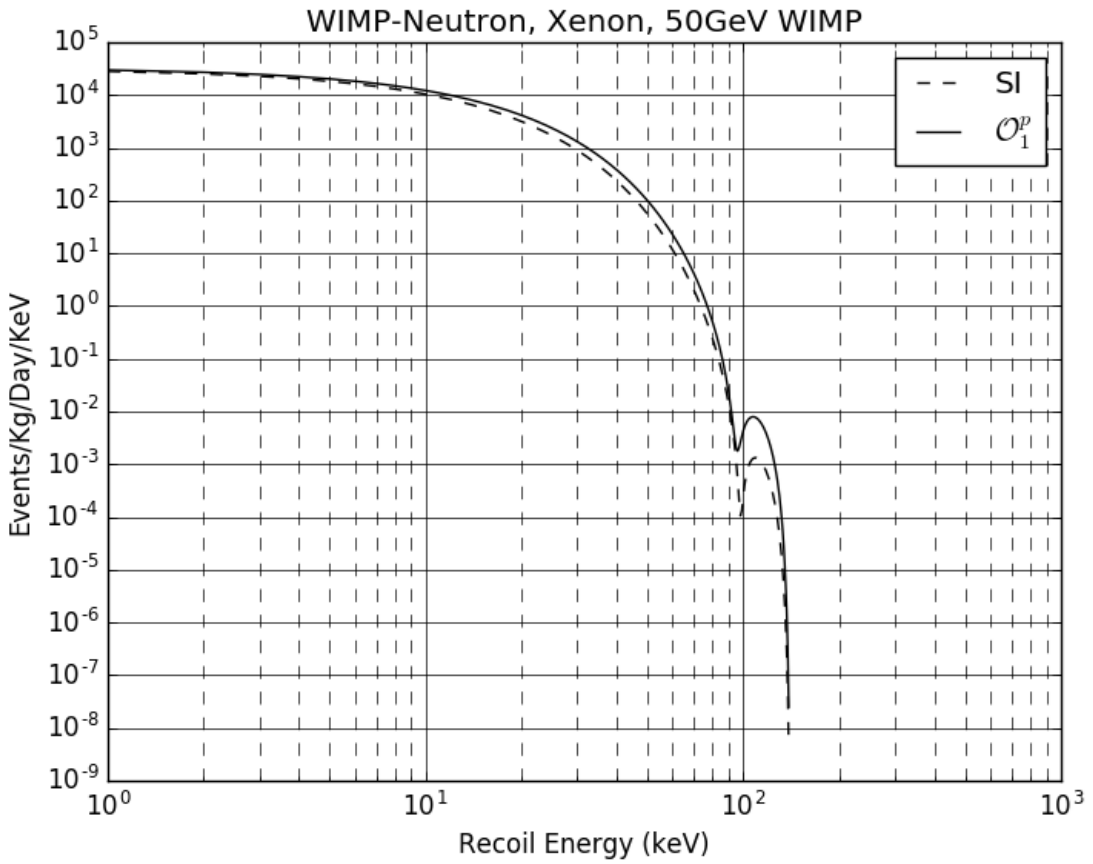


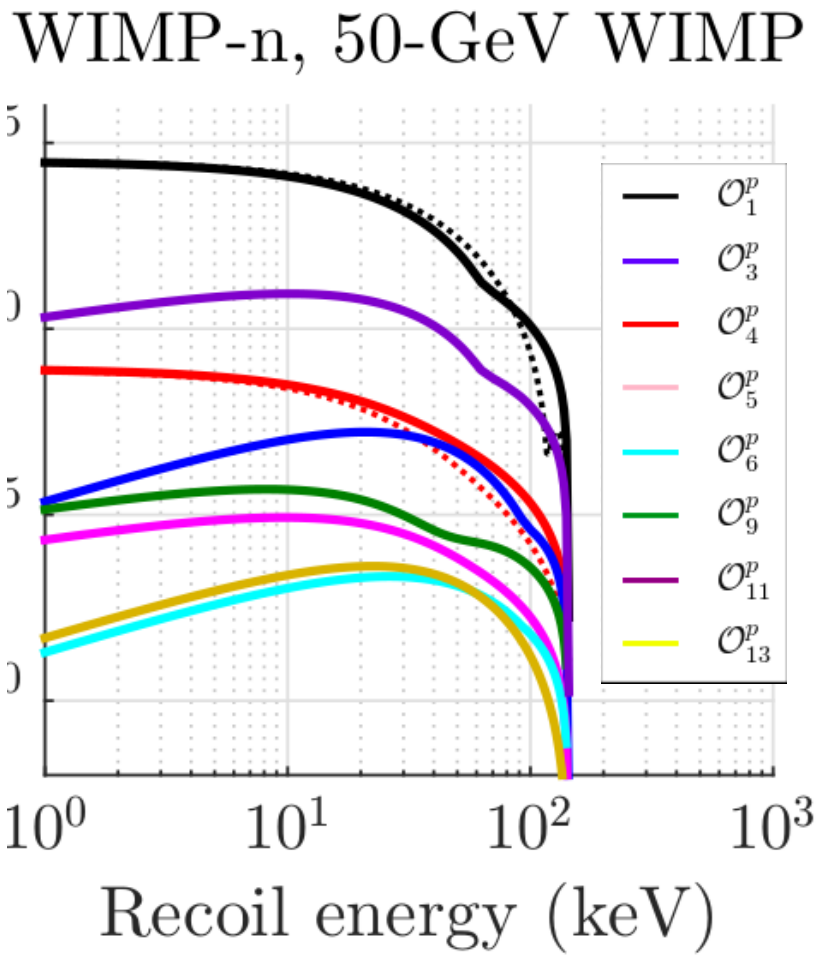



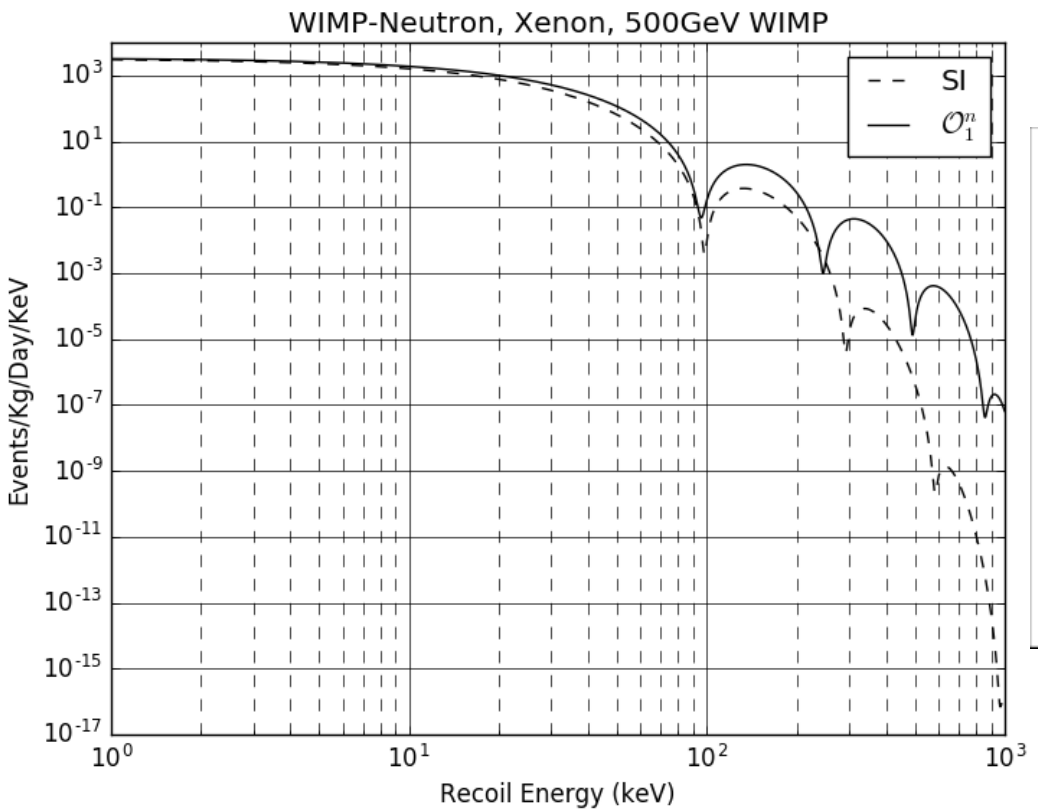

Note: I scaled the SI and O1 spectra so that they would have the same y-intercept.

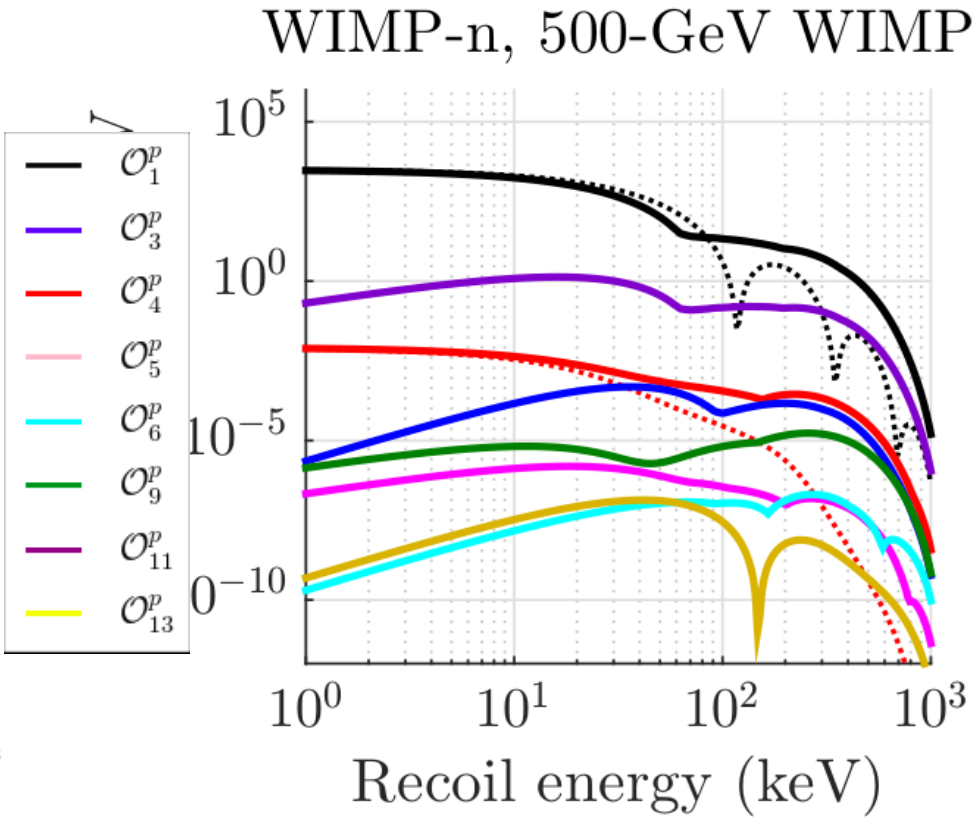

WIMP-Proton, Xenon, 500GeV WIMP
SI
$\mathcal{O}_1^p$
Events/Kg/Day/KeV
Recoil Energy (keV)

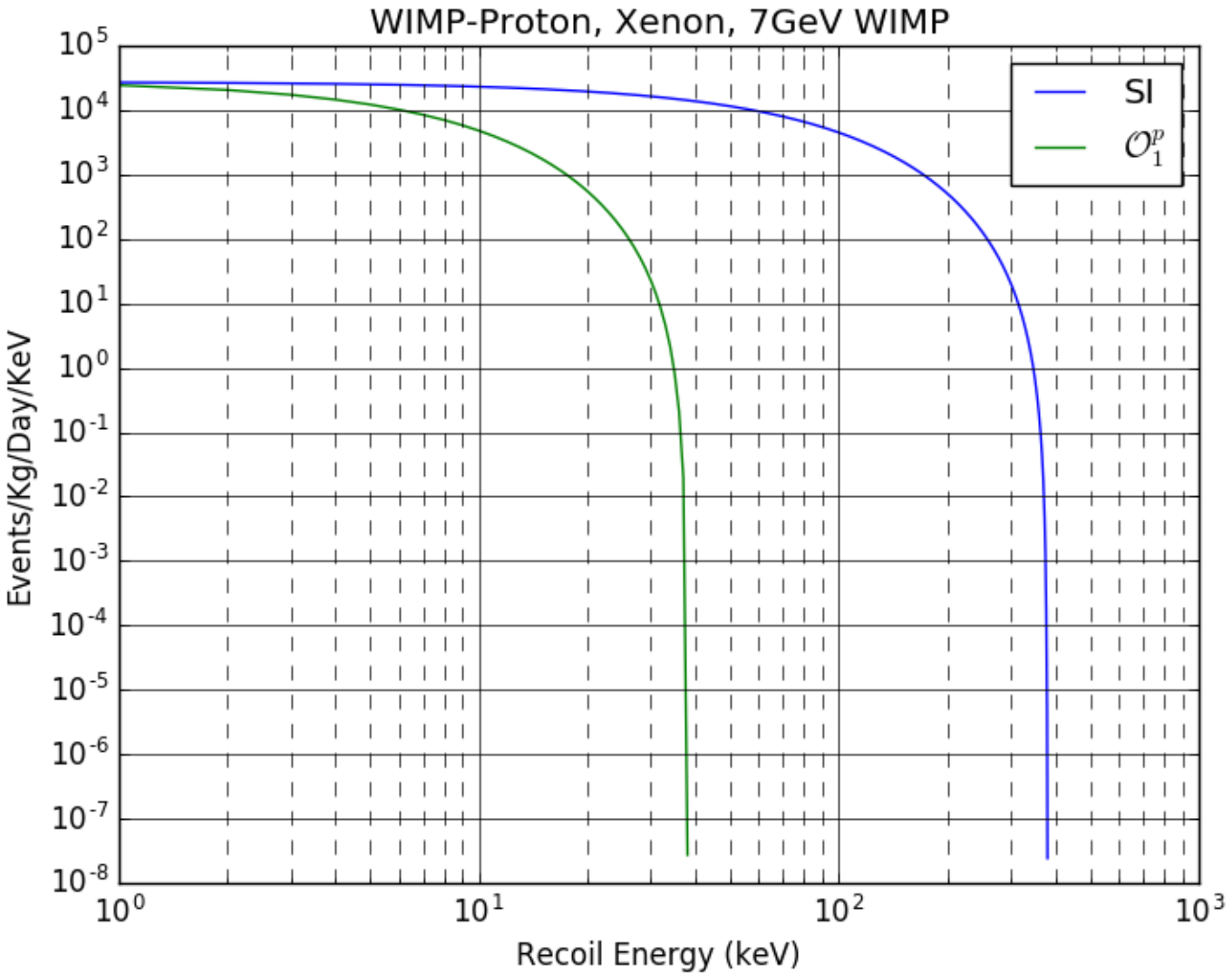

WIMP-p, 500-GeV WIMP
$\mathcal{O}_1^p$
$\mathcal{O}_3^p$
$\mathcal{O}_4^p$
$\mathcal{O}_5^p$
$\mathcal{O}_6^p$
$\mathcal{O}_9^p$
$\mathcal{O}_{11}^p$
$\mathcal{O}_{13}^p$
Recoil energy (keV)


WIMP-Neutron, Xenon, 50GeV WIMP
SI
$\mathcal{O}_1^p$
Events/Kg/Day/KeV
Recoil Energy (keV)


WIMP-n, 50-GeV WIMP
$\mathcal{O}_1^p$
$\mathcal{O}_3^p$
$\mathcal{O}_4^p$
$\mathcal{O}_5^p$
$\mathcal{O}_6^p$
$\mathcal{O}_9^p$
$\mathcal{O}_{11}^p$
$\mathcal{O}_{13}^p$
Recoil energy (keV)

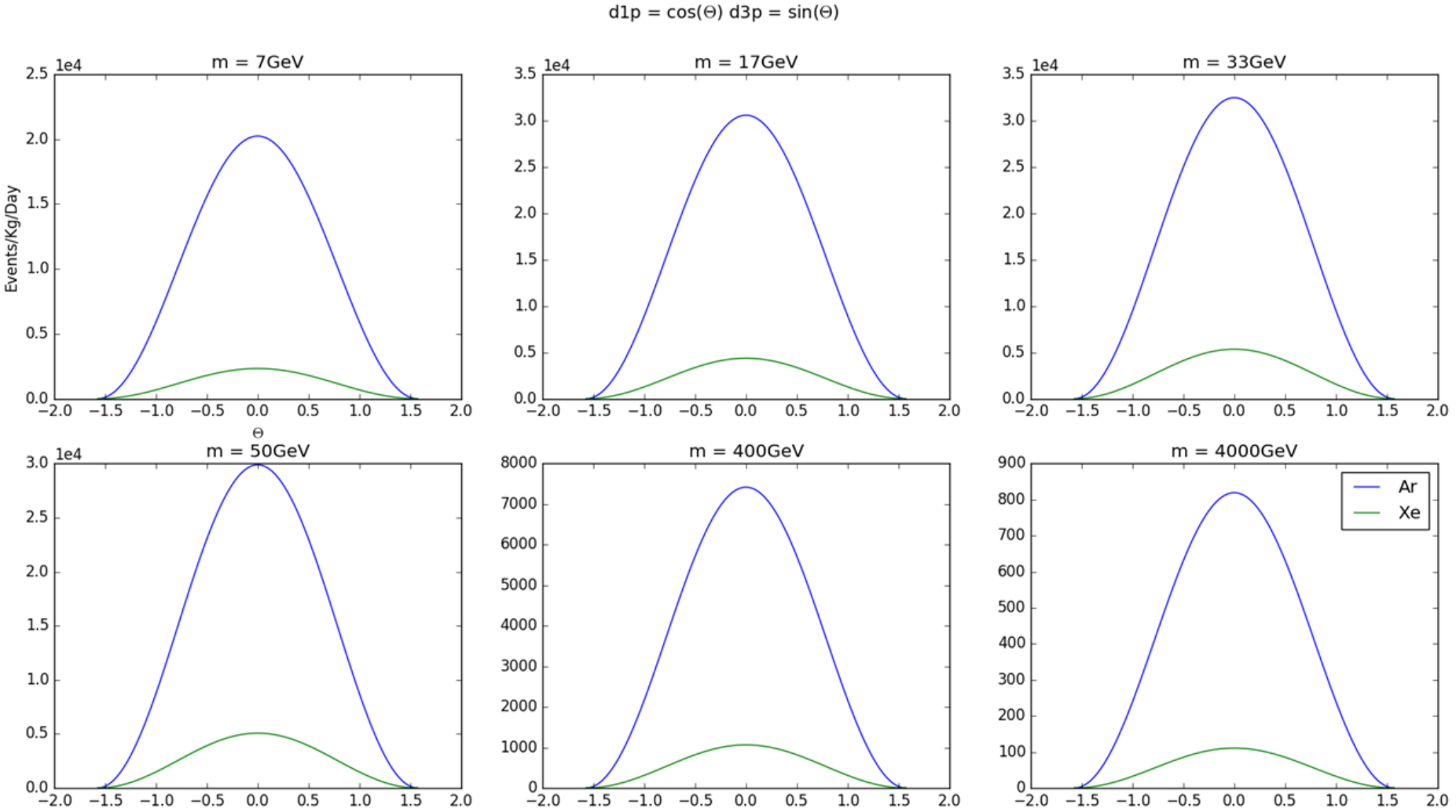

WIMP-Neutron, Xenon, 500GeV WIMP
SI
$\mathcal{O}_1^n$
Events/Kg/Day/KeV
Recoil Energy (keV)


WIMP-n, 500-GeV WIMP
$\mathcal{O}_1^p$
$\mathcal{O}_3^p$
$\mathcal{O}_4^p$
$\mathcal{O}_5^p$
$\mathcal{O}_6^p$
$\mathcal{O}_9^p$
$\mathcal{O}_{11}^p$
$\mathcal{O}_{13}^p$
Recoil energy (keV)


WIMP-Proton, Xenon, 7GeV WIMP
Events/Kg/Day/KeV
Recoil Energy (keV)
SI
$\mathcal{O}_1^p$
$10^5$
$10^4$
$10^3$
$10^2$
$10^1$
$10^0$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^{-4}$
$10^{-5}$
$10^{-6}$
$10^{-7}$
$10^{-8}$
$10^0$
$10^1$
$10^2$
$10^3$

# Argon confusion update

- Plotted “heat maps” for more values of WIMP mass.
- It does seem that the event rate for Argon is largest around the mass of Argon, which is expected.


d1p = cos(Θ) d3p = sin(Θ)
m = 7GeV
m = 17GeV
m = 33GeV
m = 50GeV
m = 400GeV
m = 4000GeV
1e4
Events/Kg/Day
Θ
Ar
Xe

# In the near future

- Start learning statistical techniques used for generating PLRs.
- Continue working with Calvin to sort out density matrix confusion.