Update 8/28/19

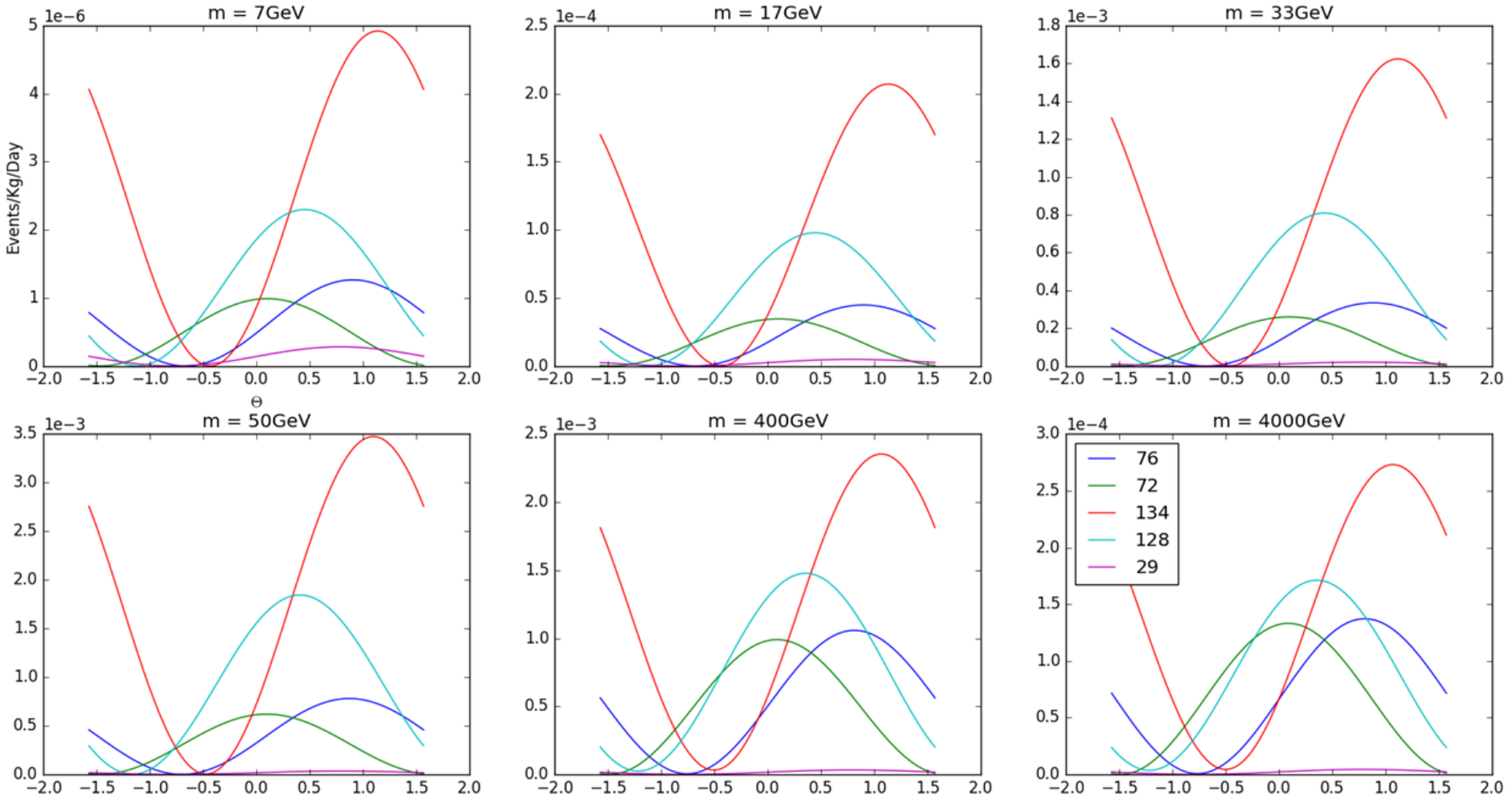
John P.

Isospin interferences

- Interesting interferences on operators that involve orbital angular momentum of nucleons (3,12,15)
- Spin dependent operators behave as expected, with sodium more sensitive to proton coupling. Xenon/Germanium more sensitive to neutron coupling.

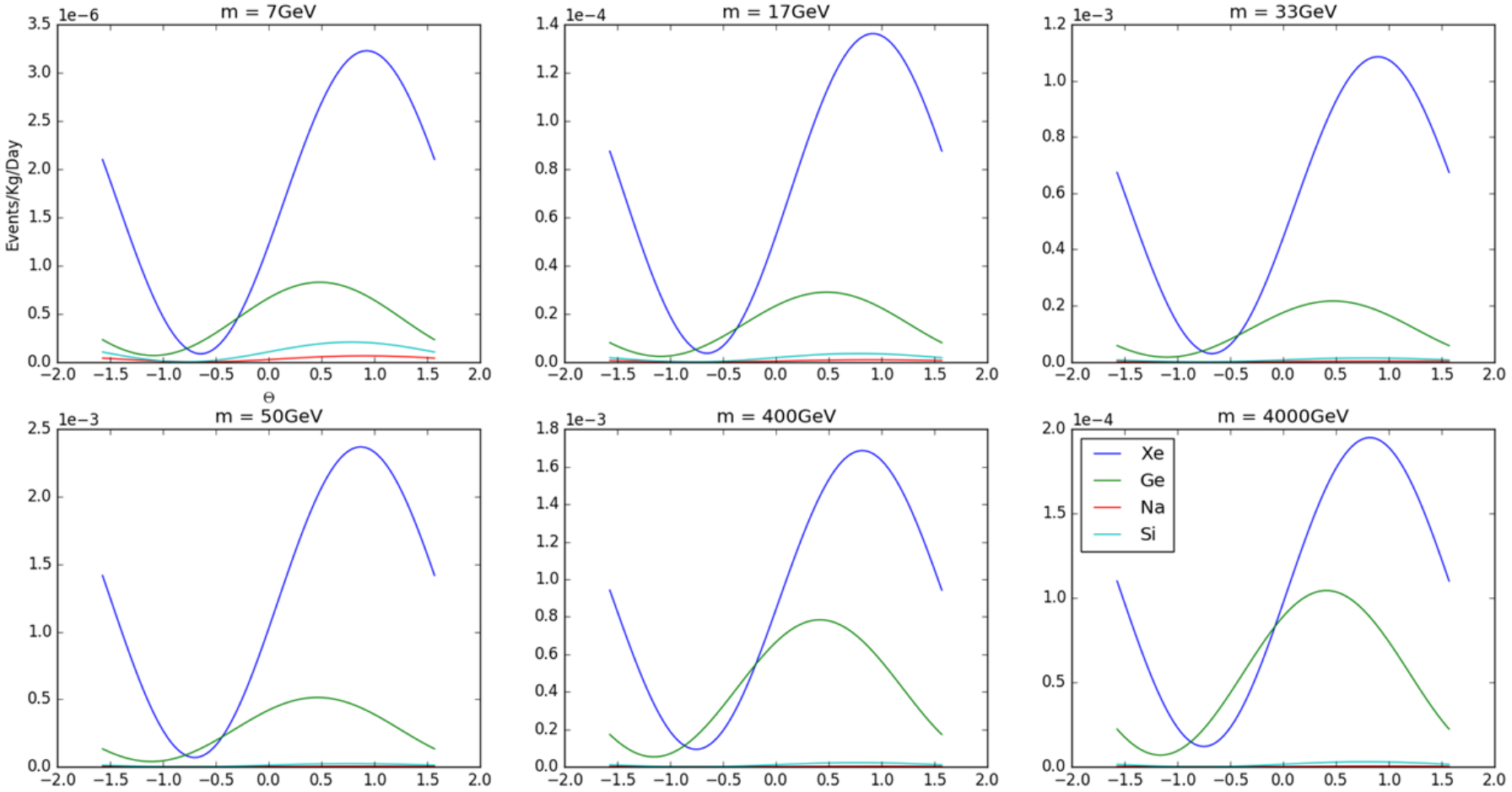
$$\mathcal{O}_3 \quad = \quad i\vec{S}_N \cdot (\vec{q} \times \vec{v}^{\perp})$$

d3p = cos(Θ) d3n = sin(Θ)



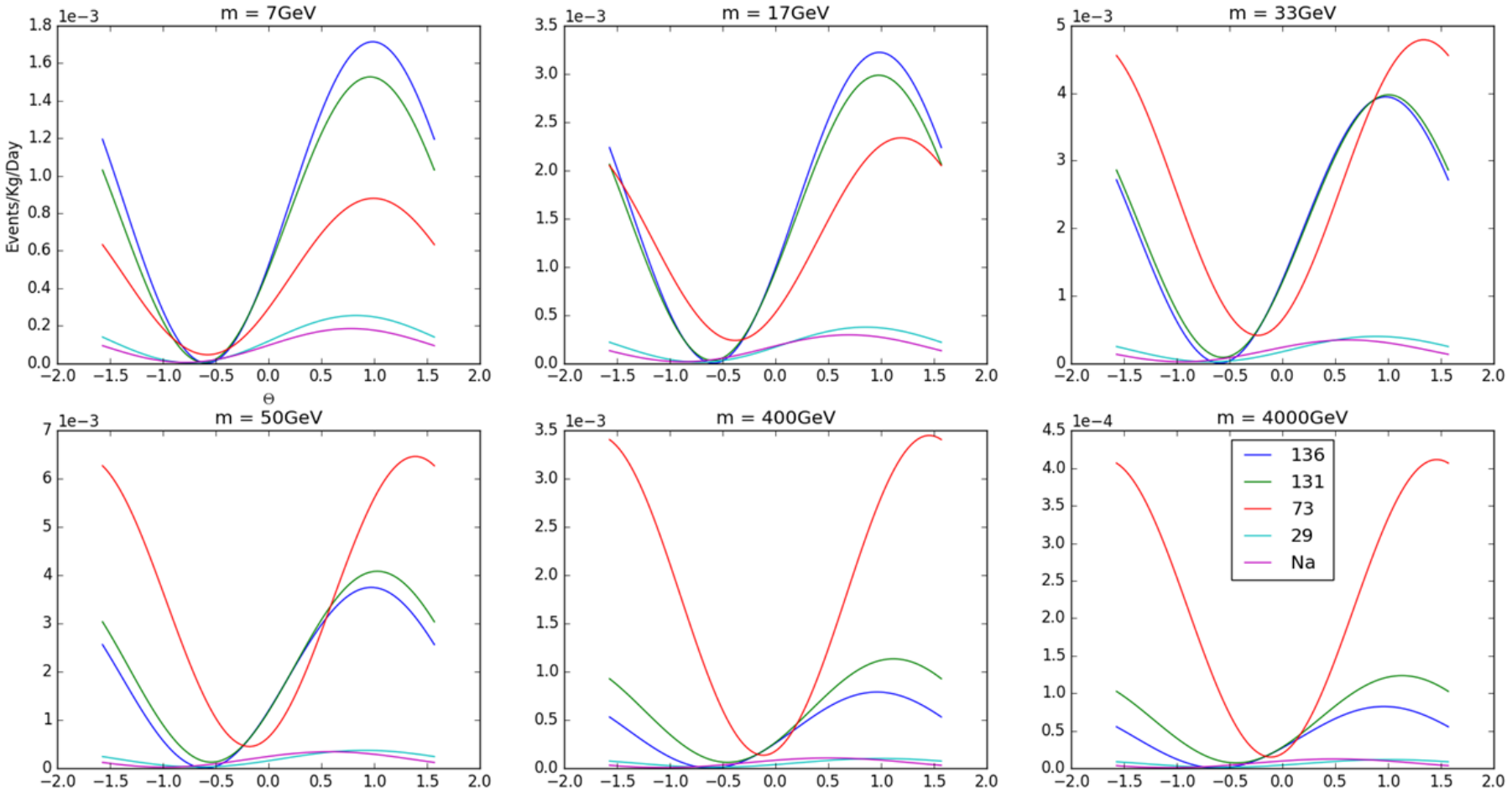
$$\mathcal{O}_3 = i\vec{S}_N \cdot (\vec{q} \times \vec{v}^{\perp})$$

d3p = cos(Θ) d3n = sin(Θ)

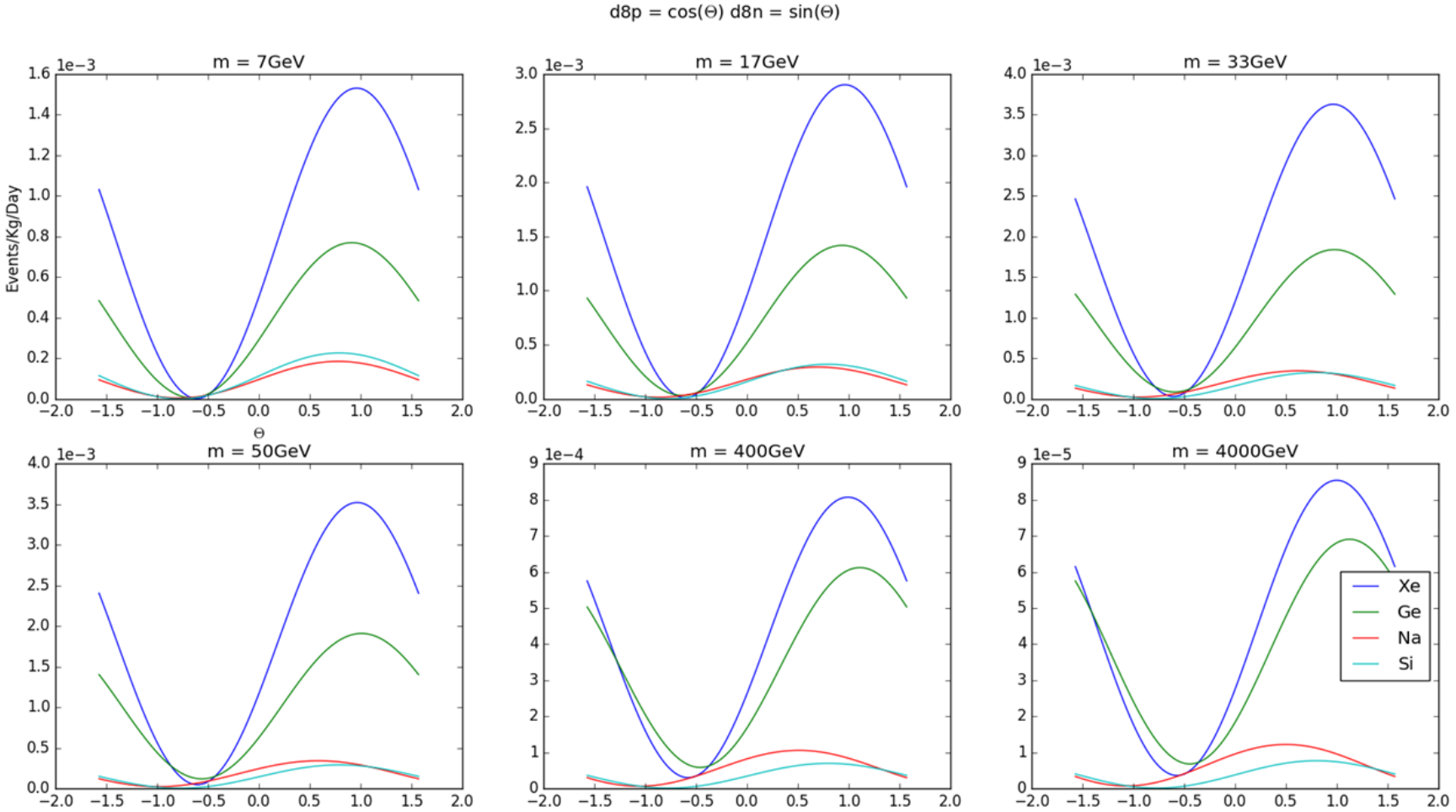


$$O_8 = \vec{S}_\chi \cdot \vec{v}^\perp$$

d8p = cos(Θ) d8n = sin(Θ)

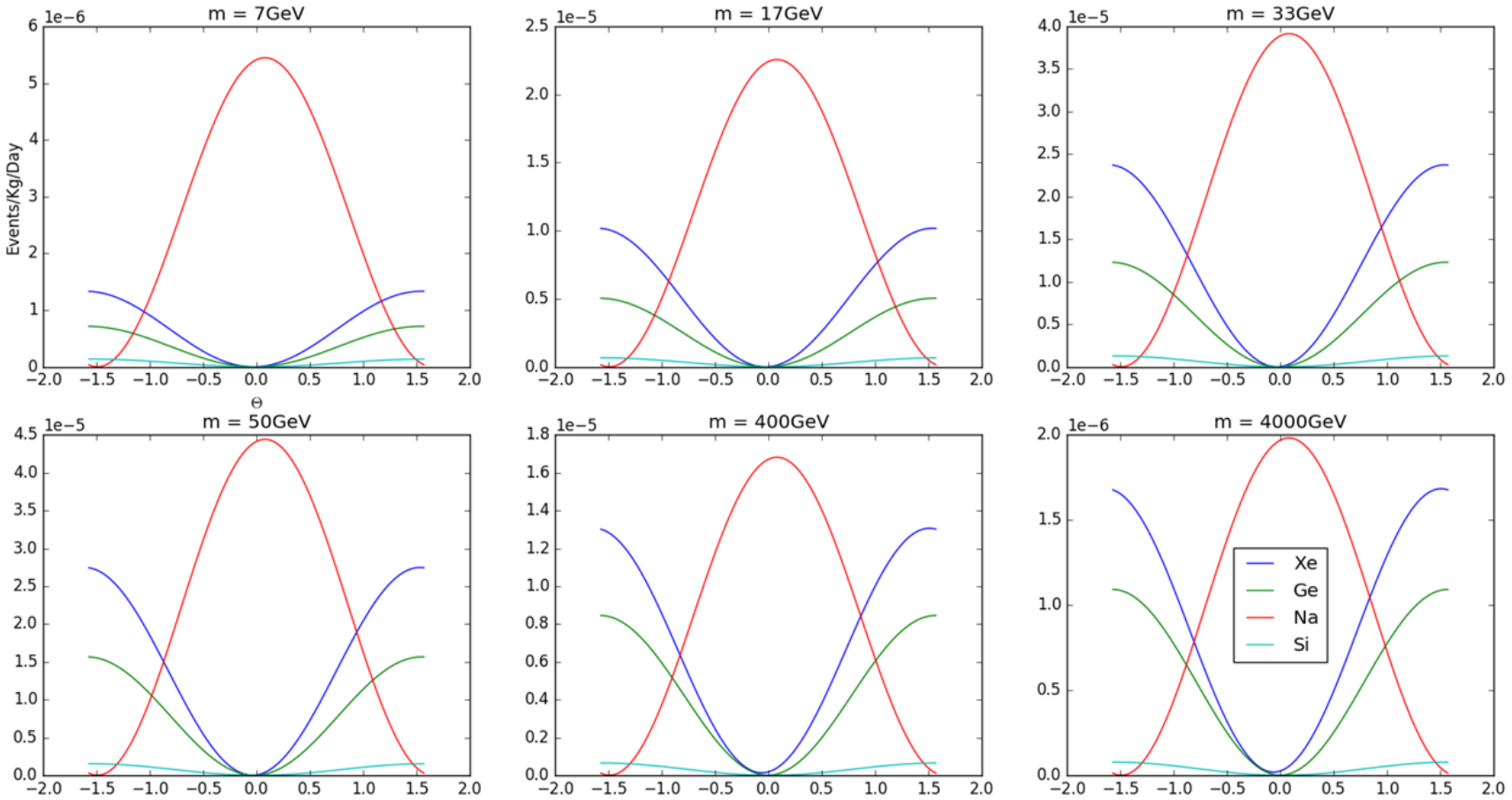


$$O_8 = \vec{S}_\chi \cdot \vec{v}^\perp$$



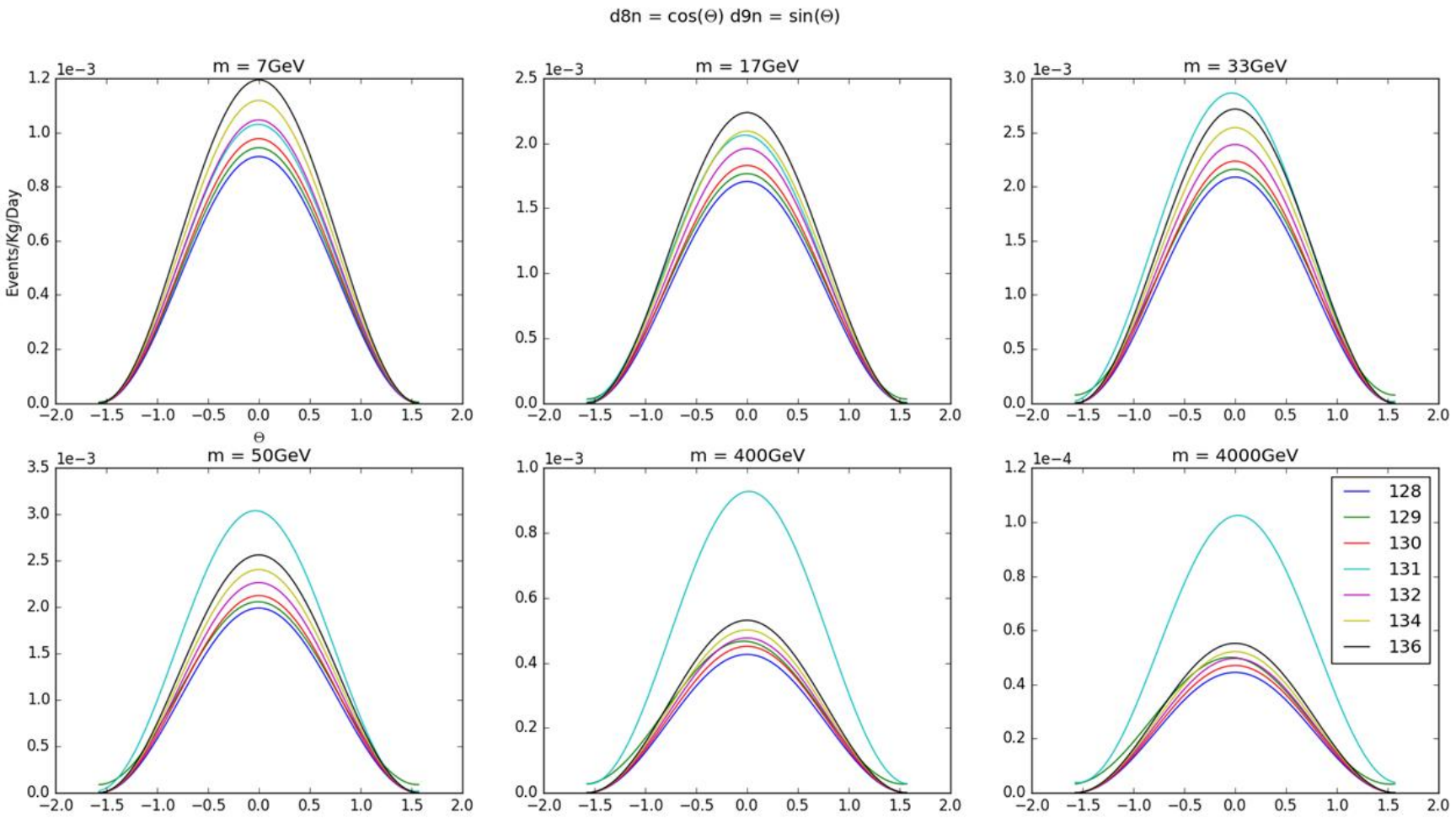
$$\mathcal{O}_9 \quad = \quad i\vec{S}_\chi \cdot (\vec{S}_N \times \vec{q})$$

d9p = cos(Θ) d9n = sin(Θ)



Operator Interferences

- It’s always the case that one operator is much stronger than other for all isotopes, so operator interference “heat maps” tend to always have the same shape.


d8n = cos(Θ) d9n = sin(Θ)
m = 7GeV
m = 17GeV
m = 33GeV
m = 50GeV
m = 400GeV
m = 4000GeV
Events/Kg/Day
Θ
1e−3
1e−4
128
129
130
131
132
134
136

To do

- Time Mathematica code.
- Make actual heat maps showing both isospin and operator interferences.
- Sort out Argon density matrix confusion.
- Study for the qual.
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