

Results

Dataset

Run 4 Upgrade

- **Our Analysis Dataset:**

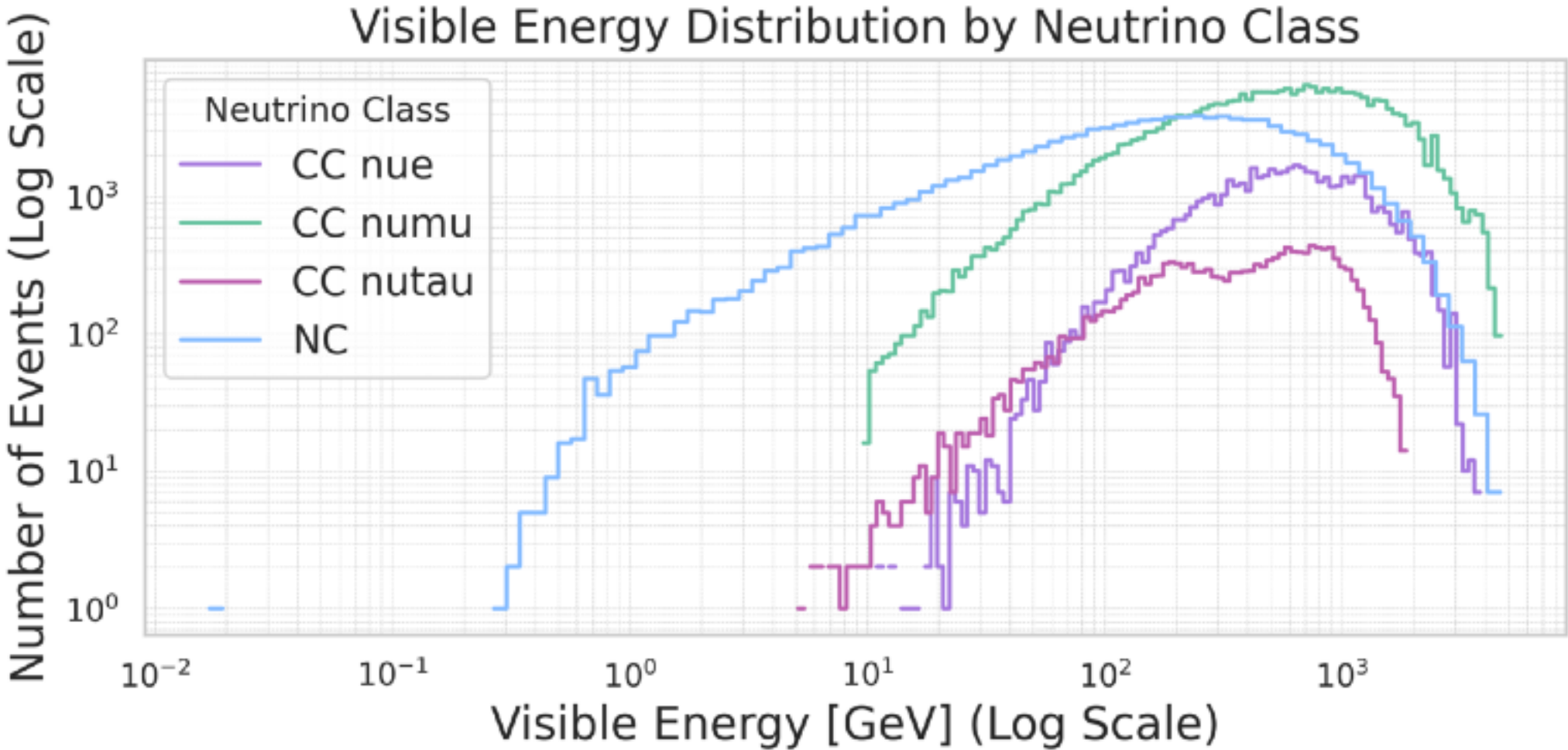
- Simulated events for the FASERCal Run 4
- Training set: ~261k events
- Test set: ~131k events

- **Energy Spectra**

- The plot shows that different neutrino interaction types from ~GeV to ~TeV

- **Extreme Class Imbalance**

- Tau Neutrino CC events are extremely rare.
- This imbalance is the central difficulty for identifying rare physics signals.



Interaction Type	Events	%
ν_e CC	53,072	12.18
ν_μ CC	261,180	59.95
ν_τ CC	14,880	3.42
NC	106,502	24.45
Total	435,634	100