

# Dataset

## Run 4 Upgrade

- **Our Analysis Dataset:**

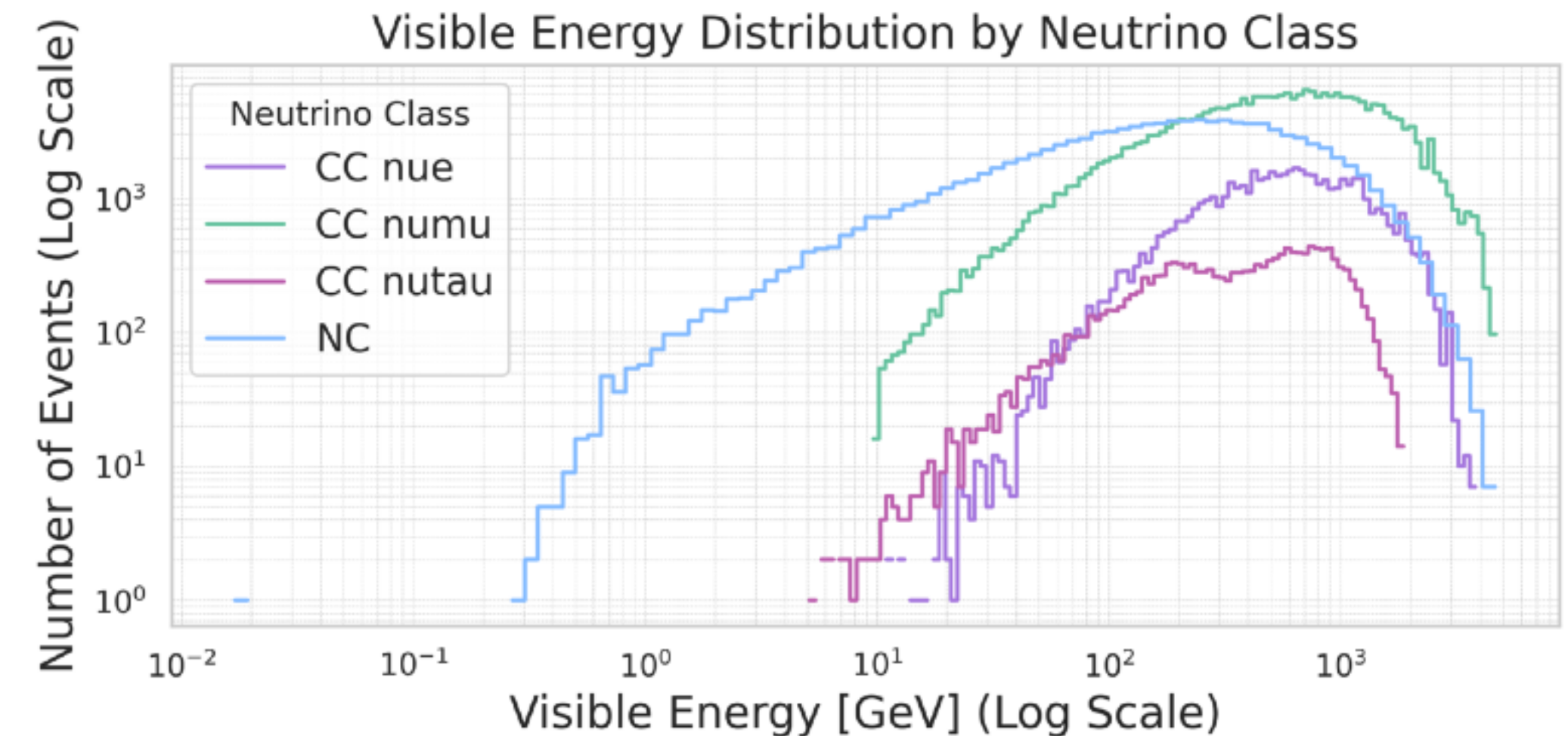
- Simulated events for the FASERCal Run 4
- Training set: ~261k events
- Test set: ~131k events

- **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	%
$\nu_e$ CC	53,072	12.18
$\nu_\mu$ CC	261,180	59.95
$\nu_\tau$ CC	14,880	3.42
NC	106,502	24.45
<b>Total</b>	<b>435,634</b>	<b>100</b>

# Results

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## Boosted Decision Trees