

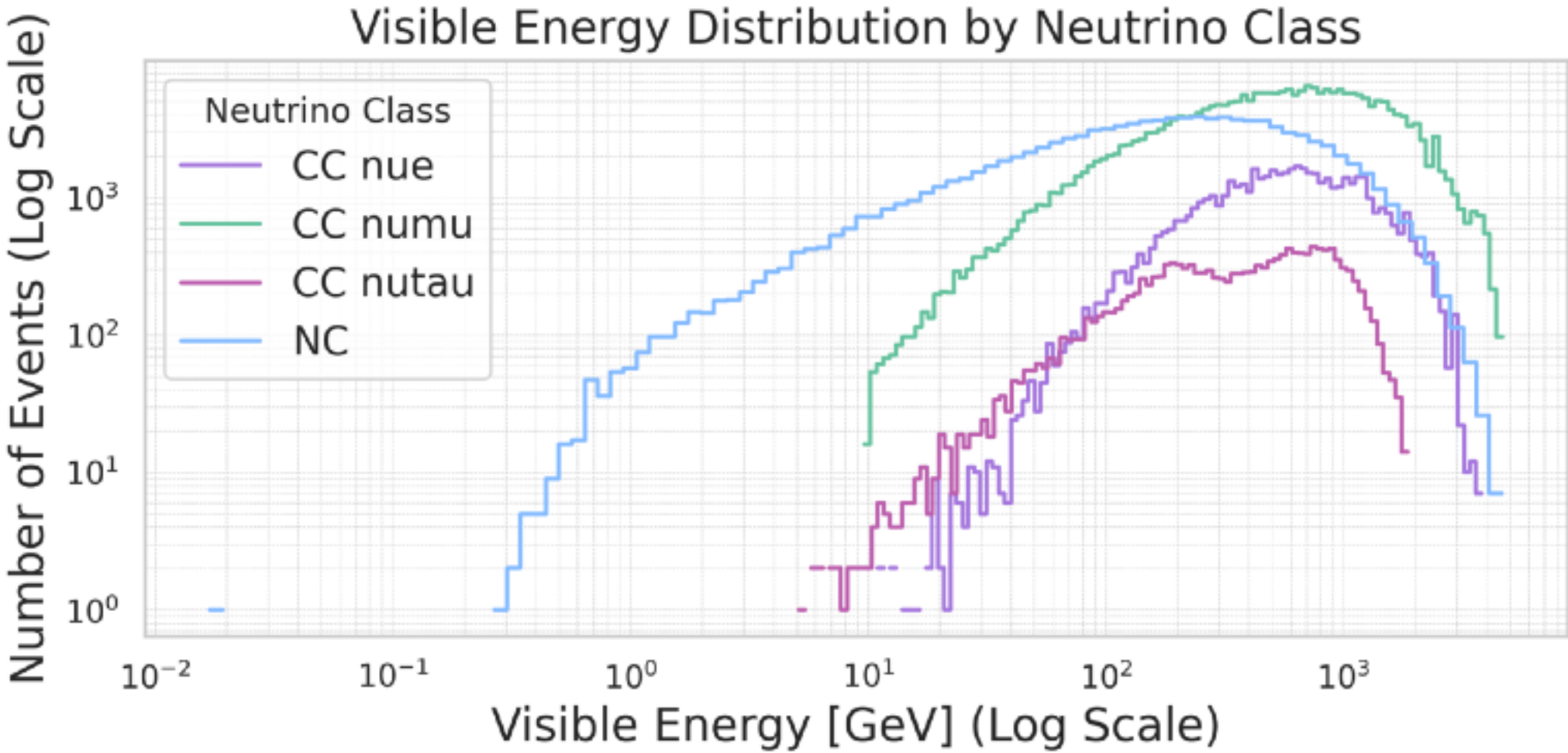
# Methodology

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# Dataset

## FASERCal Simulated Data

- **Simulated Dataset:**
  - Training set: ~261k events.
  - Test set: ~131k events.
- **Energy Spectra:** interaction from ~GeV to ~TeV.
- **Class Imbalance Problem:**
  - $\nu_\tau$  CC events are extremely rare.
  - *Imbalance*: 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> |