

Results

Boosted Decision Trees

BDT: Flavour

Classification Results

- Baseline Model:
 - A **Boosted Decision Tree (BDT)**, a conventional machine learning algorithm.
 - Serves as a robust benchmark to quantify what's possible *without* 3D deep learning.
- Input Features
 - No per-voxel 3D information.
 - Total energy sums from different calorimeter sections:
 - FaserCal, RearCal, HCal, MuTag
- **Strong on dominant classes:** Achieves high recall (93%) for NuMu CC, likely driven by the strong signal in the Muon Tagger. Fails completely on rare signals: Achieves 0% recall for NuTau CC.

Class	Precision	Recall
ν_e CC	0.74	0.60
ν_μ CC	0.81	0.93
ν_τ CC	0.00	0.00
NC	0.66	0.57

Pred	True ν_e	True ν_μ	True ν_τ	True NC
ν_e CC	9,579	1,219	250	1,911
ν_μ CC	4,116	74,208	1,640	11,757
ν_τ CC	0	0	0	1
NC	2,141	4,618	2,599	18,201