# LST1 mono: RFs vs CTLearn

# Dataset and software

**CTLearn**

CTLearn 0.10.3 (dev)

CTLearn manager 0.1.1 (dev)

ctapipe 0.25.1

**RFs**

lstchain 0.11.3

ctapipe 0.25.1

/fefs/aswg/mc/LST_Advanced_Camera_Prod1/{particle}/zenith_20deg/south_pointing/4LSTs_PMT/sim_telarray/

# Issues

- In CTLearn, Selected LST1 both for training and reconstruction
- In DL2 files, in dl1.event.subarray.trigger all the events (also the ones not triggering LST1) are kept, while in dl2.event.subarray.energy.CTLearn only events triggering LST1 are there, so the length of the tables are really different (almost 2x)
  - As a consequence, ctapipe cannot build irfs complaining about a mismatch in table length.
  - I tried to manually cut the trigger table in DL2 files, but these modified files are not accepted by ctapipe, complaining about the presence of MaskedNDArrays
- So, I used a notebook based on Pyirf (the same one used for MCP performance paper, adapted to the slightly different data format and to mono analysis) to produce irfs. For the sensitivity, a notebook by Julian S (the same one used for MCP performance paper, adapted to the slightly different data format and to mono analysis) for sensitivity.
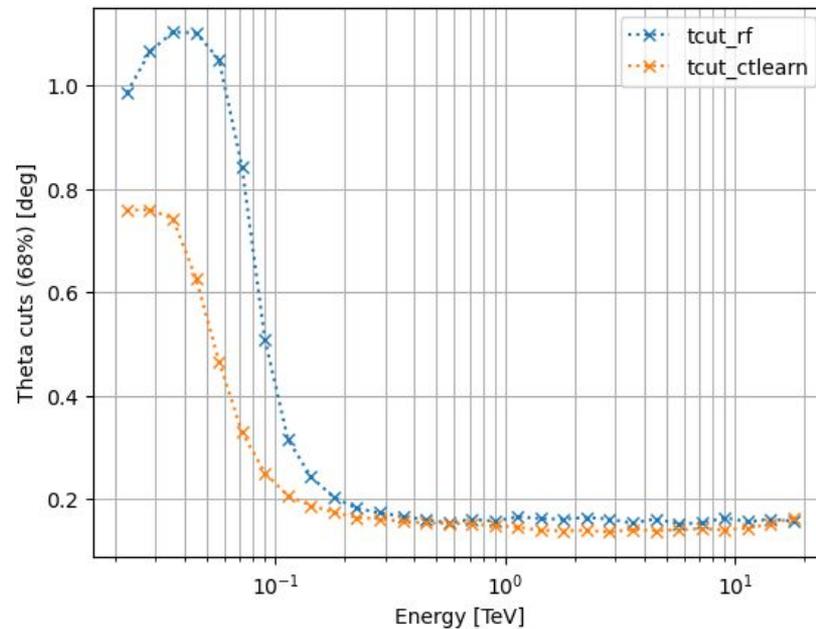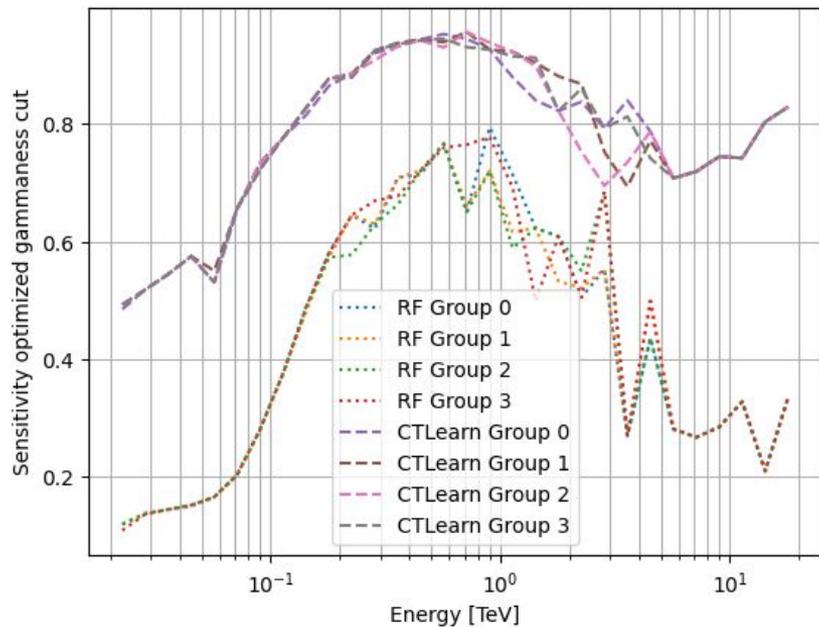  - These two notebooks are also used for lstchain performance
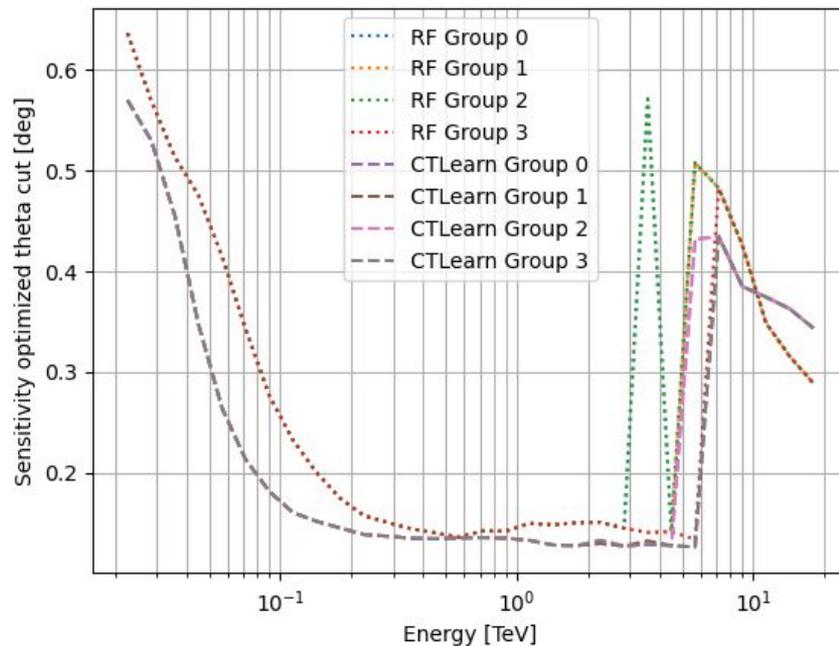
# Loss (CTLearn)
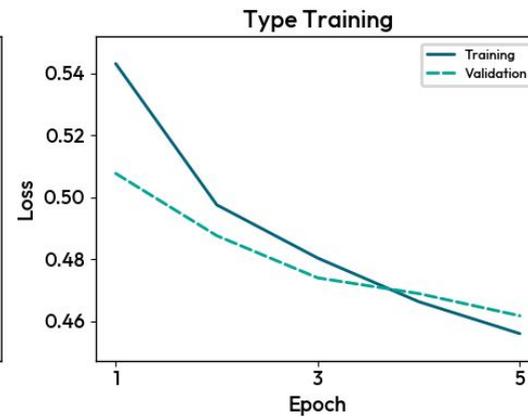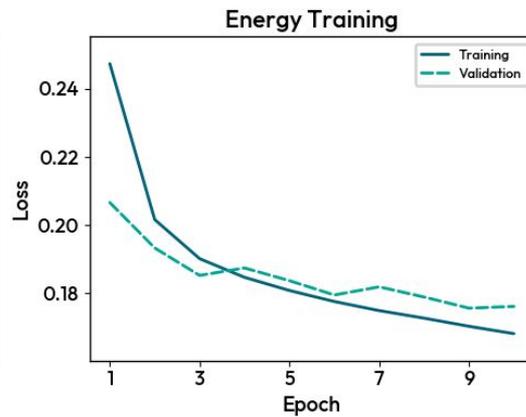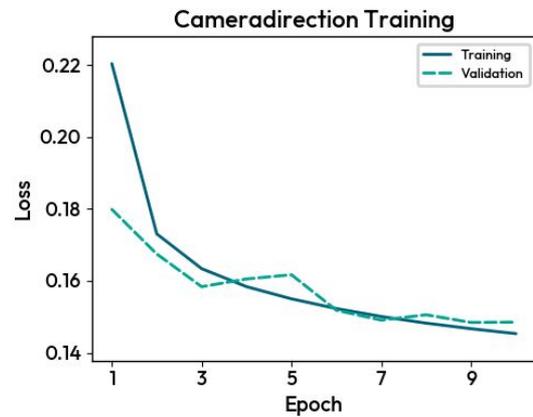
# Efficiency cuts cuts
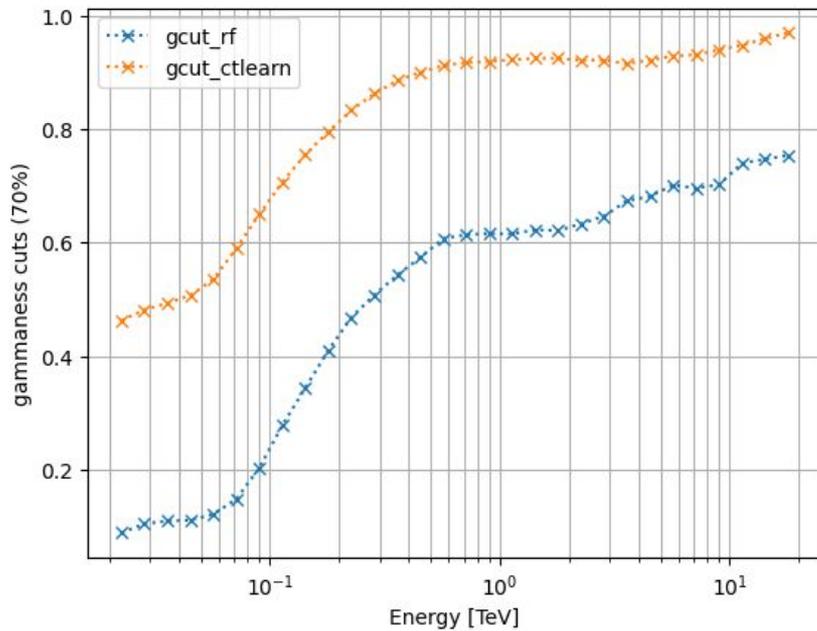
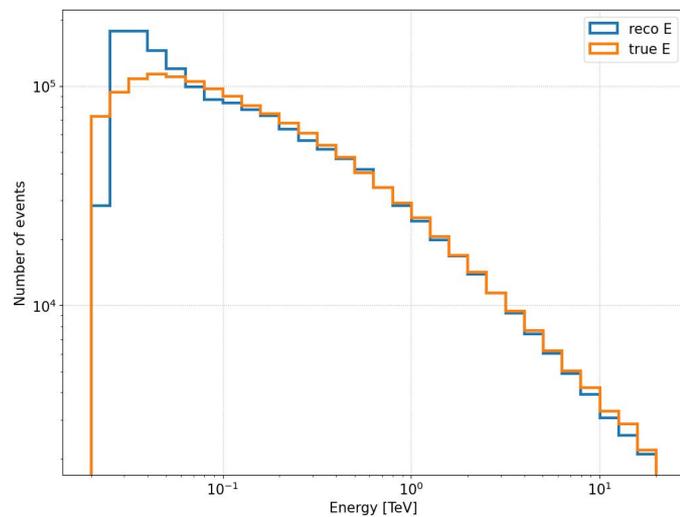## Used for all IRFs except sensitivity
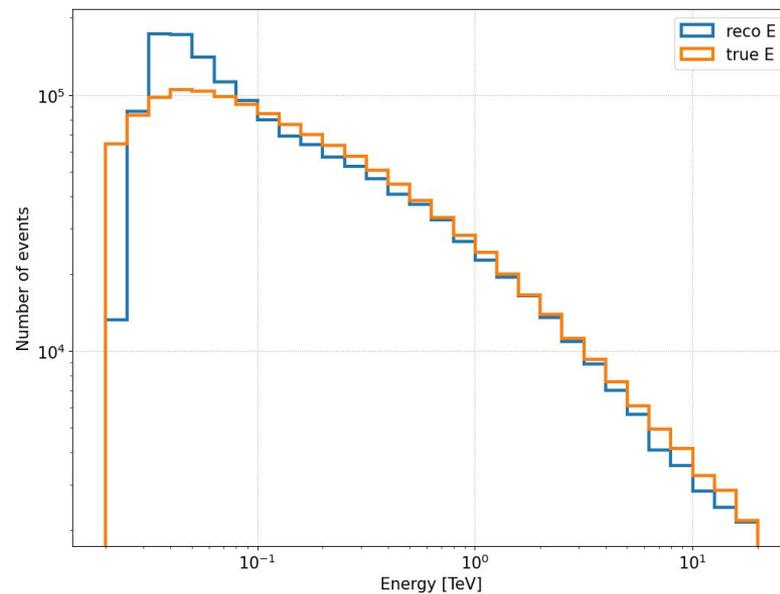
# Sensitivity optimized cuts    Used for sensitivity

# True vs Reco energy distribution

CTLearn

RF

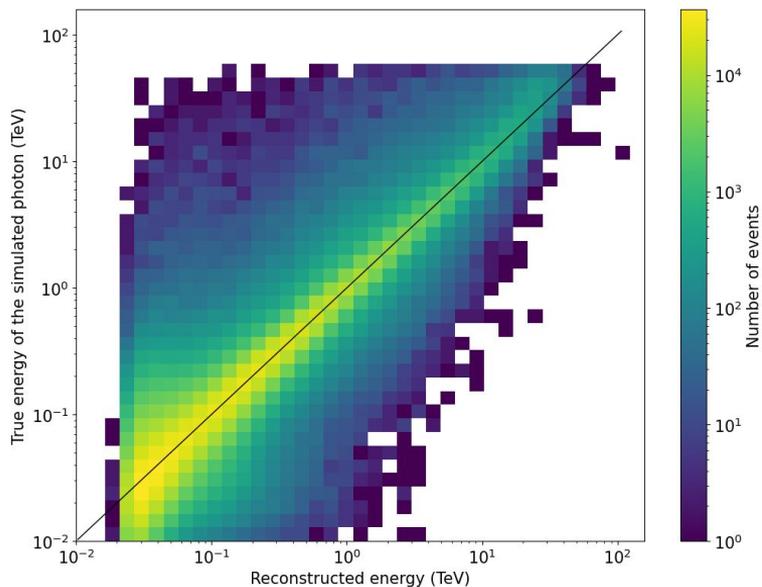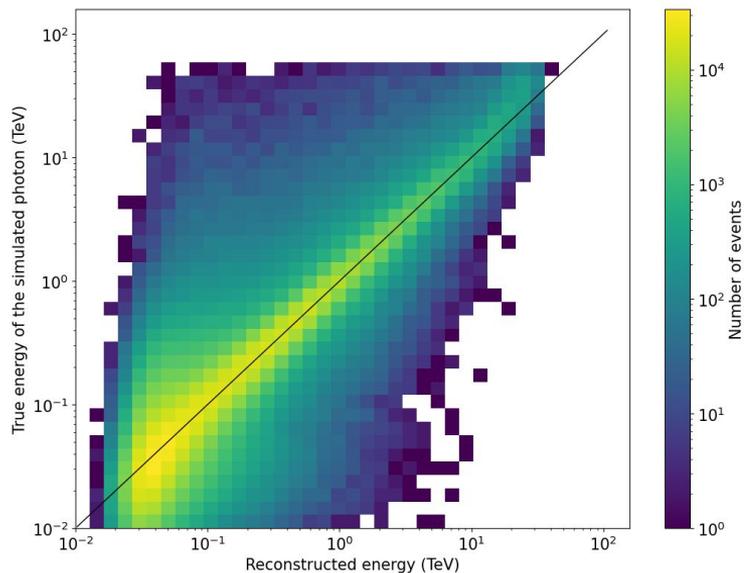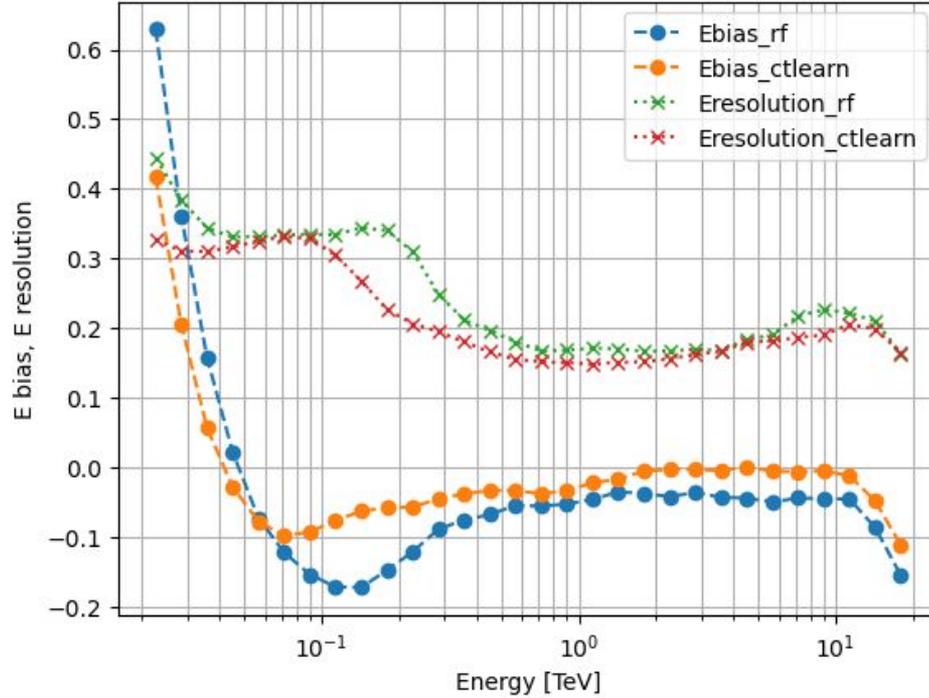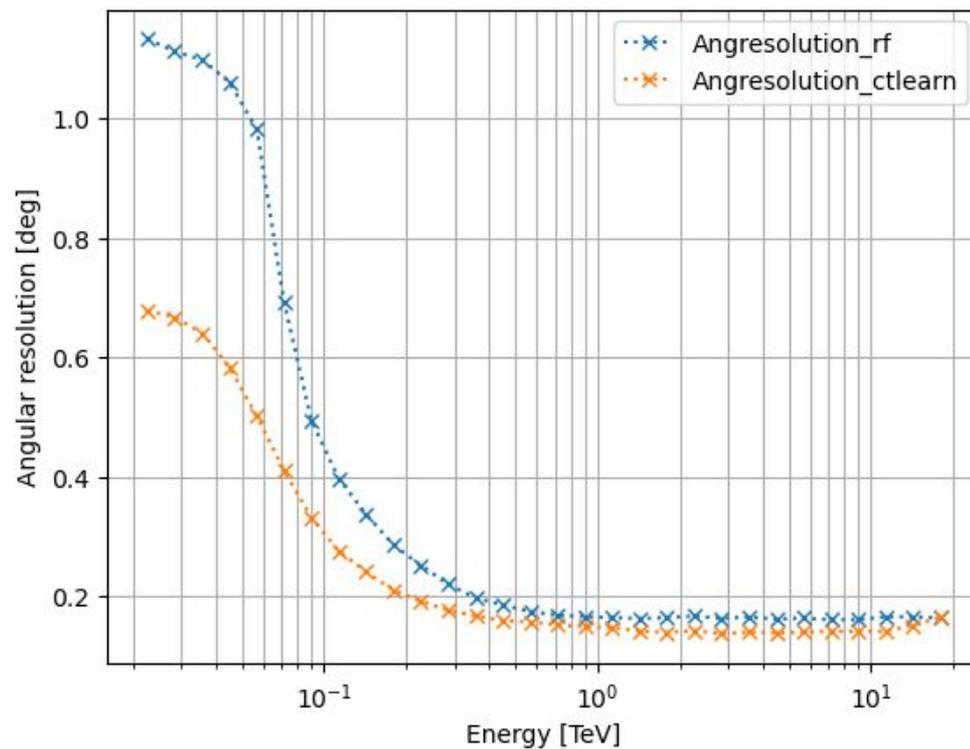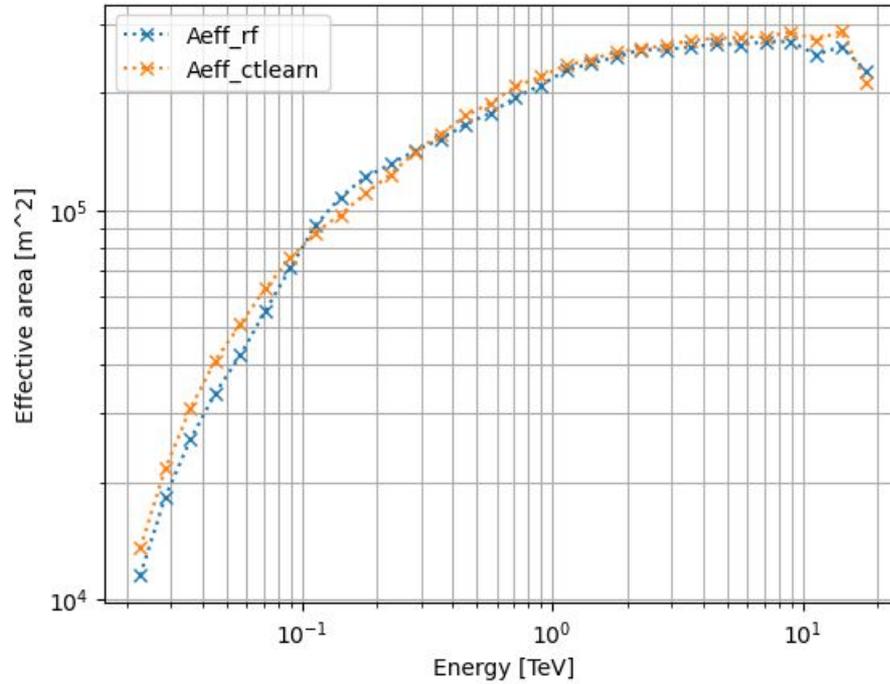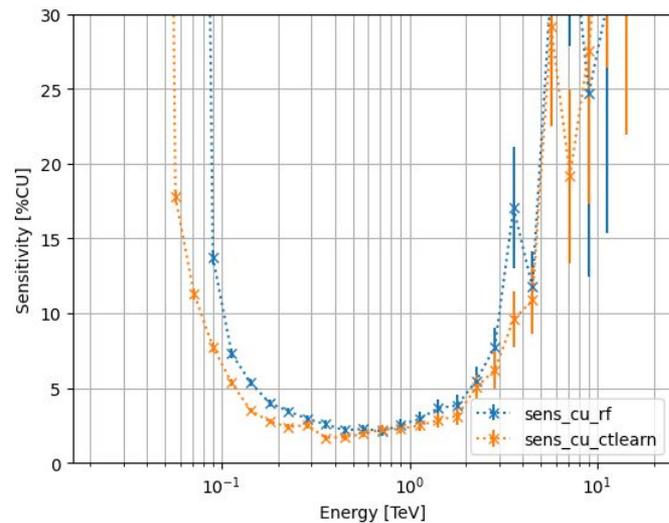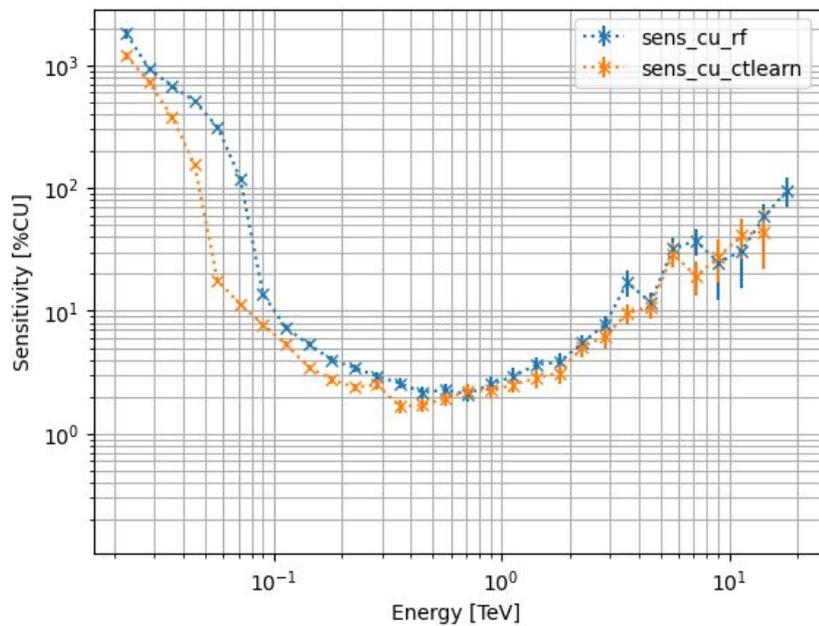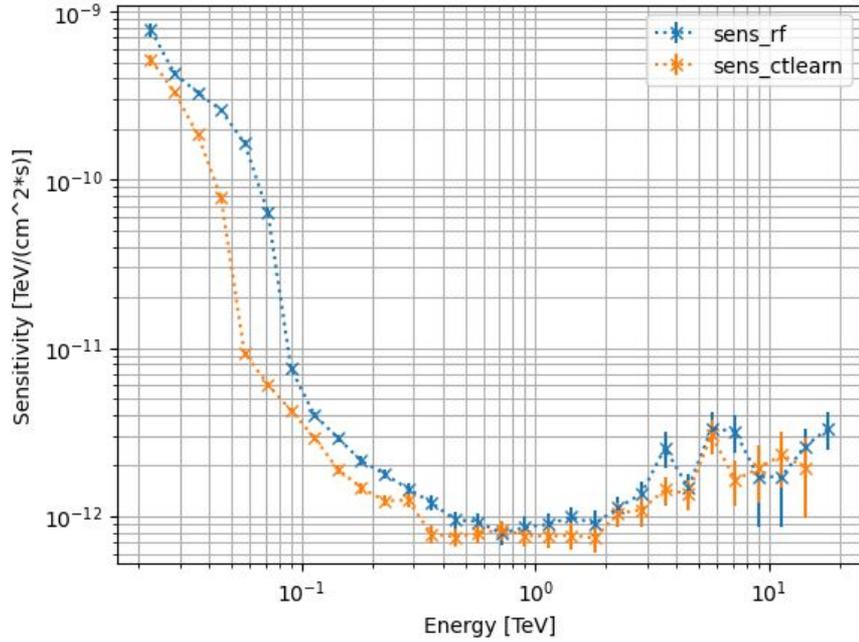# Migration Matrix

CTLearn

RF

# E bias and resolution
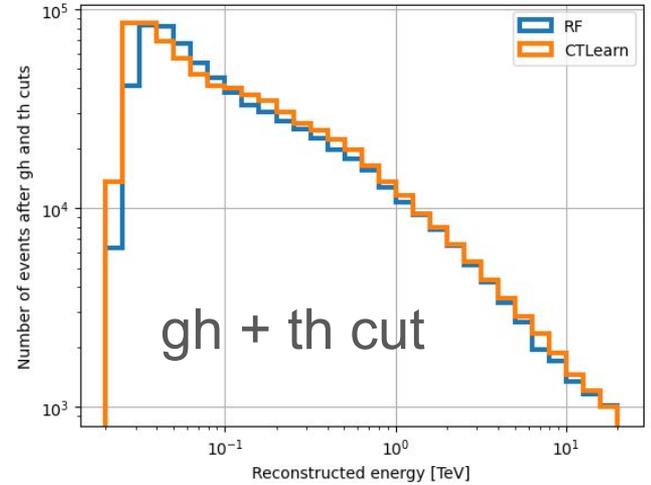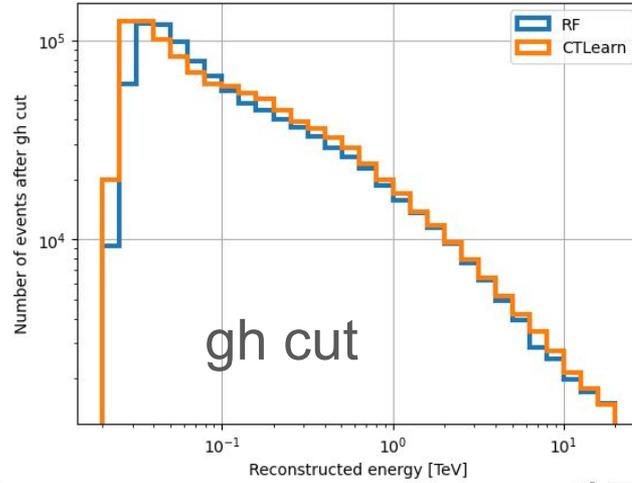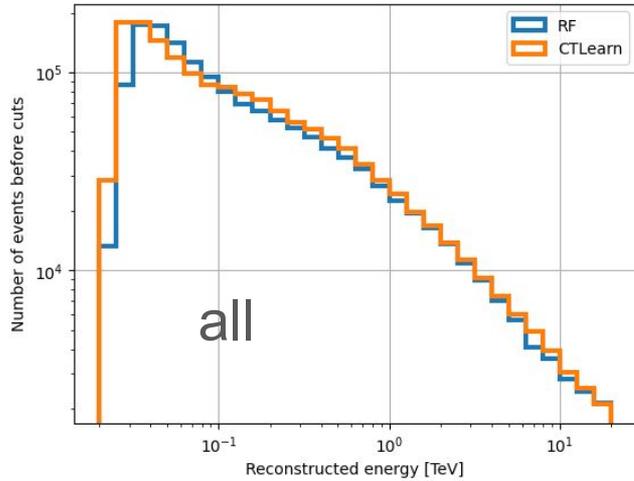
# Angular resolution

# Effective area

# Sensitivity

# Sensitivity
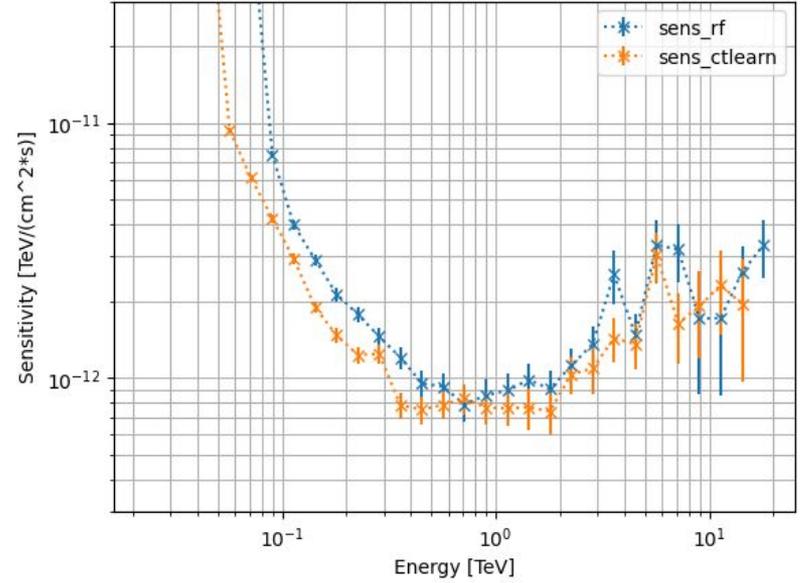
# Energy distribution of events



RF
CTLearn

gh cut

all

gh + th cut