DEEP LEARNING FOR τ ID: SUMMARY OF RESULTS AND ONGOING WORK

- analysis of ideal configuration (test-beam prototipe geometry module): DONE
  - almost perfect identification of different tau decays using state of the art ConvNet
- ongoing step: move to IDEA detector with realistic conditions
  - several MC samples produced (LorenzoP): $Z \rightarrow \tau\tau$ (principal decay modes) and $Z \rightarrow qq$ events with full sim in two scenarios:
    - no magnetic field and no material before the dual readout calorimeter
    - magnetic field and material
  - ongoing design and training of different ANN architectures (results will be ready soon):
    - conventional CNN
    - graph-NN and point-cloud networks
  - two initial tasks:
    - discrimination tau - jets
    - tau decay identification
- Currently involved:
  - senior physicist + one full time master student in computer science (already started by a couple of months) + two new master students (1 physics + 1 CS) will join before the end of the year: offline studies + fast simulation based on generative-DL
  - senior physicist + 3 PhD students (part-time): study of real-time implementation of the different models