Electron Charge Confusion

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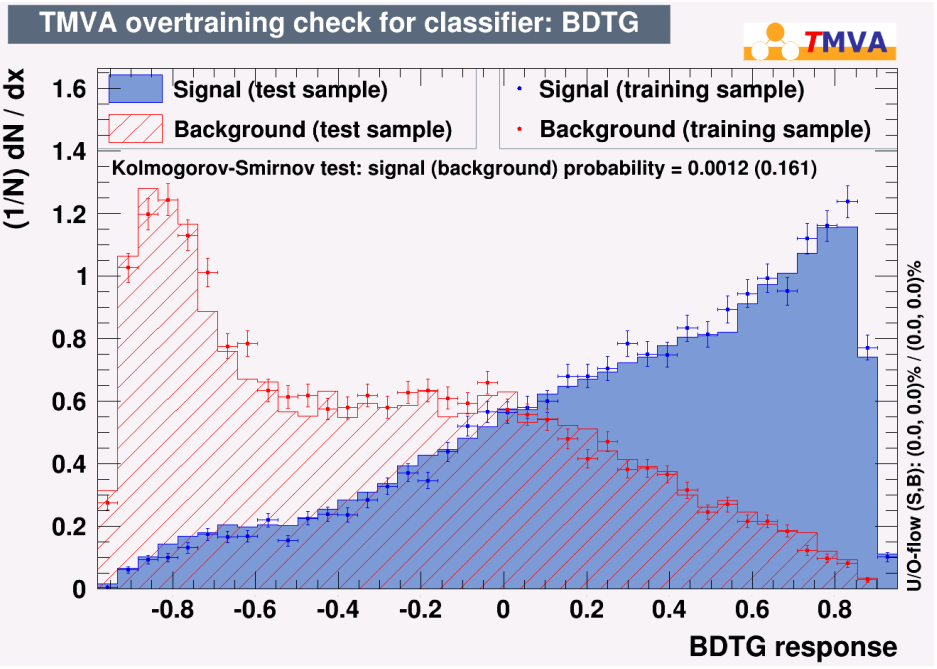
Data Selection and Cut Condition

MC: B1043 electron 50-2000GeV

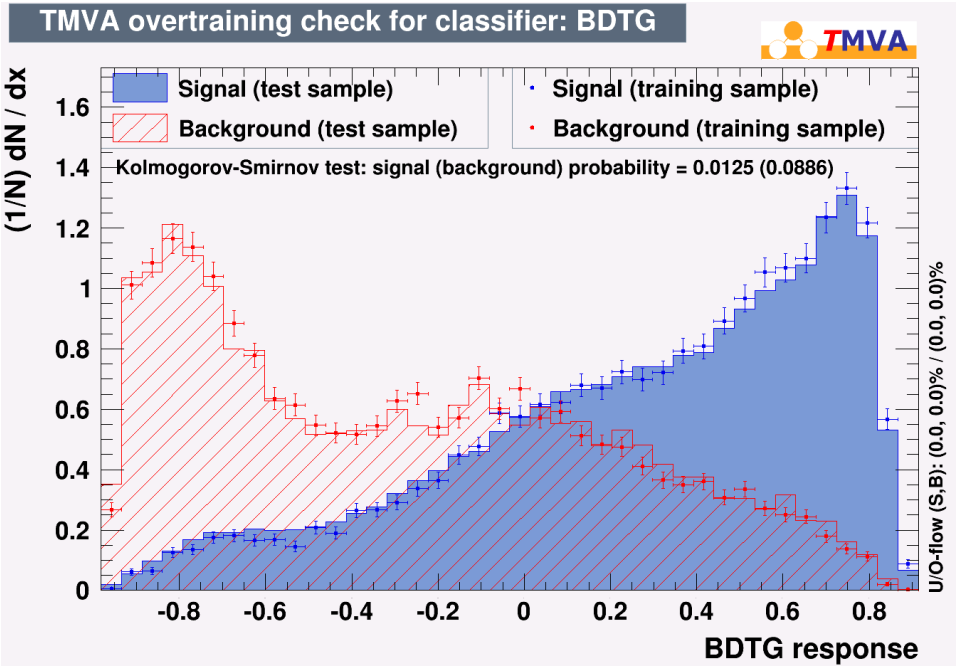
Cut:

- **1TRD tracker, 1Tracker tracker**
- **Tracker L1,L9 alignments agree**
- **Ecal nshower = 1 or 2**
- **TRD nhits > 14**
- **Tof betah >= 0.7**
- **0.8 < Tracker Inner Q < 1.4**
- **Tracker chi2y < 10**
- **trk-ecal match**
- **Tracker Pattern: FullSpan+InnerL9**

Training Result With and Without EOP



BDTG with EOP in Training



BDTG without EOP in Training

MC Reweight

MC generate flux: E^{-1}

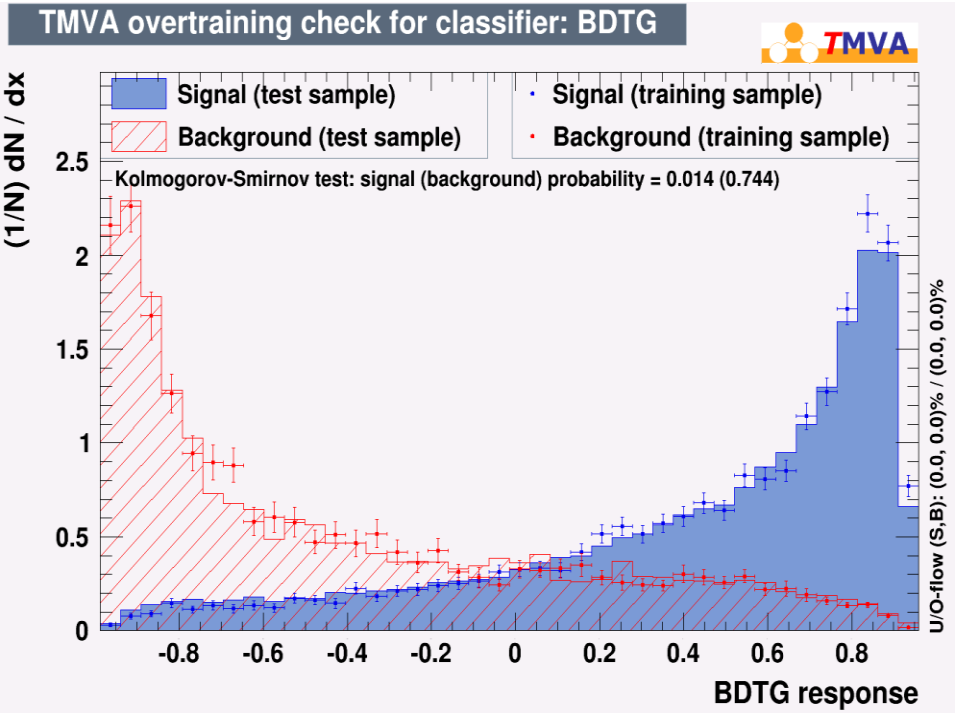
Electron flux in primary cosmic rays: $E^{-3.2}$

MC reweight correciton: $P_{MCGen}^{-2.2}$

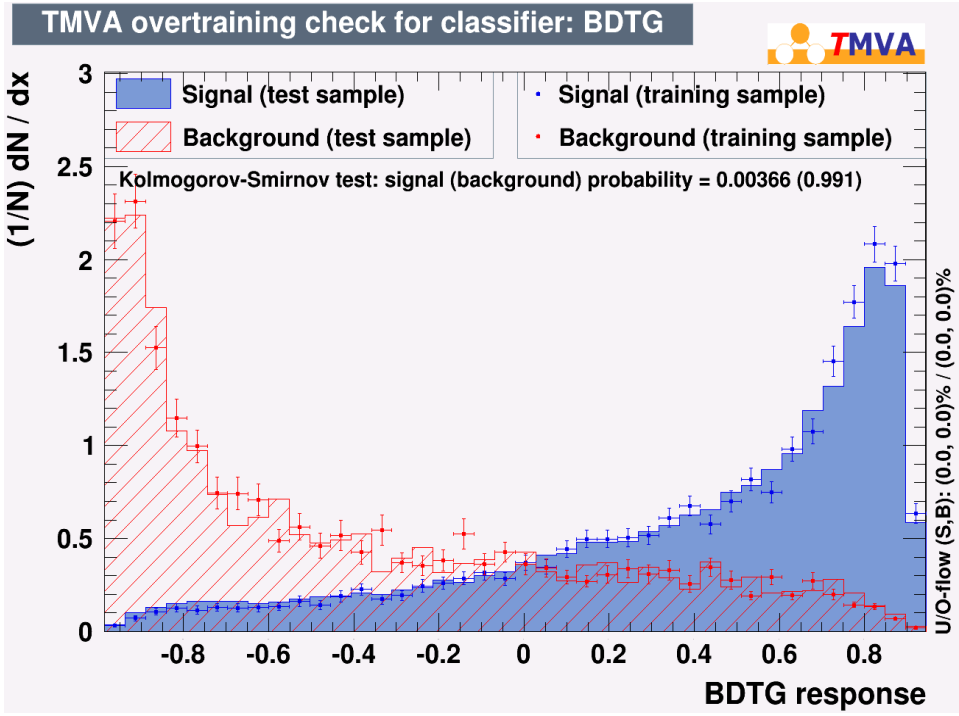
- **MC reweight correction in BDT training.**

- **MC reweight correction in background template.**

BDT Training with MC Reweight



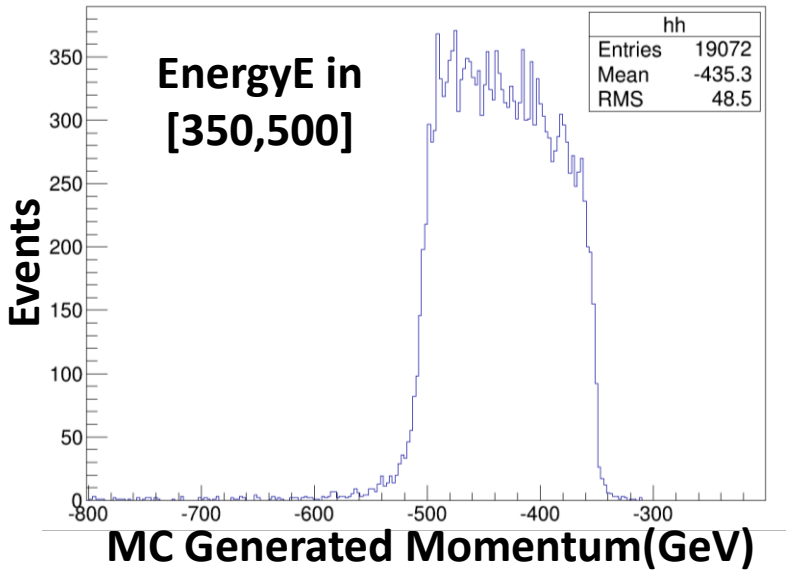
BDTG with EOP in Training

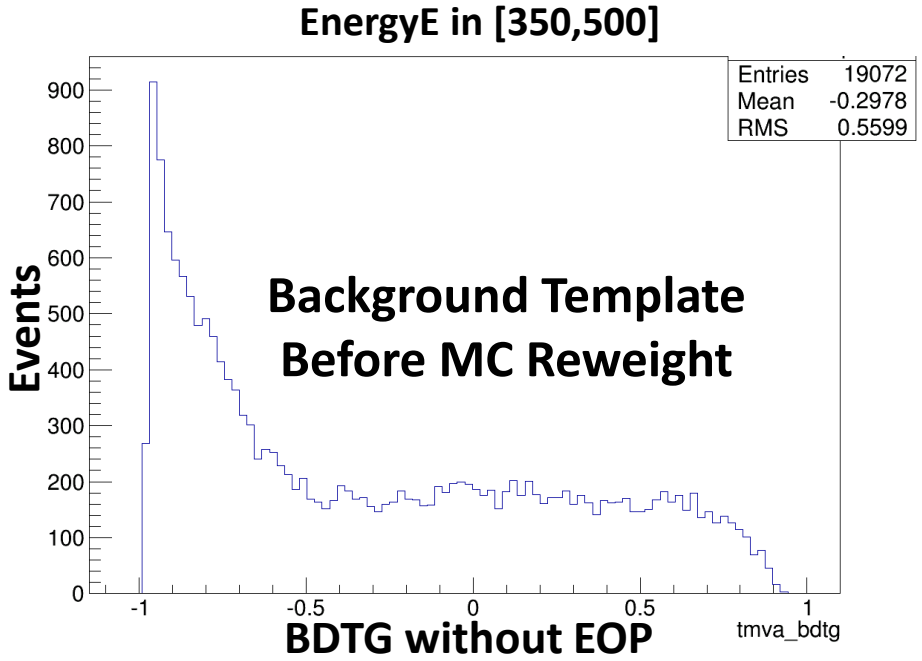


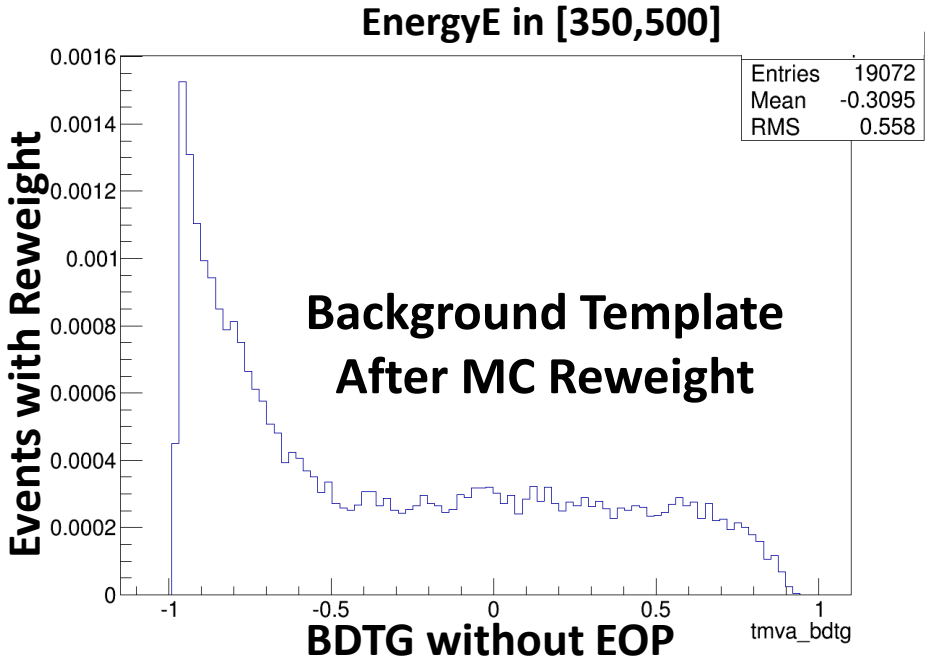
BDTG without EOP in Training

Background Template with MC Reweight

- The ECAL energy resolution is lower than 2% after 100GeV.
- The range of MC generated momentum is almost in [350,500].
- The influence of MC reweight correction is quite small for background template.

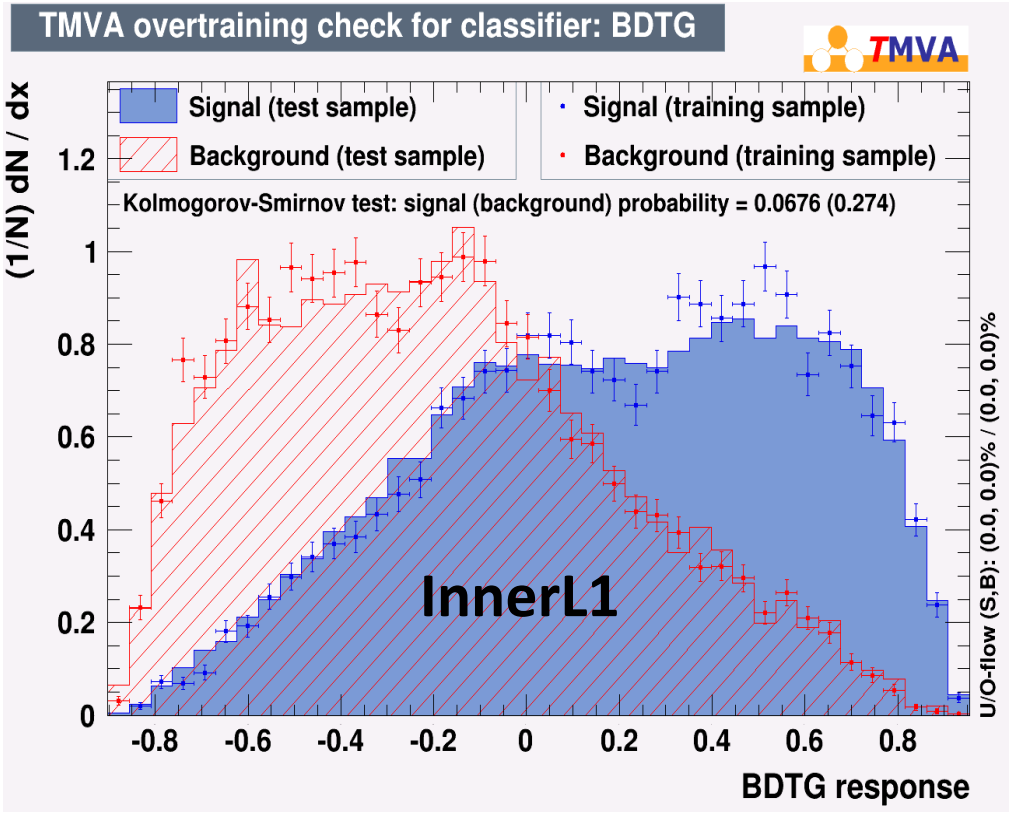


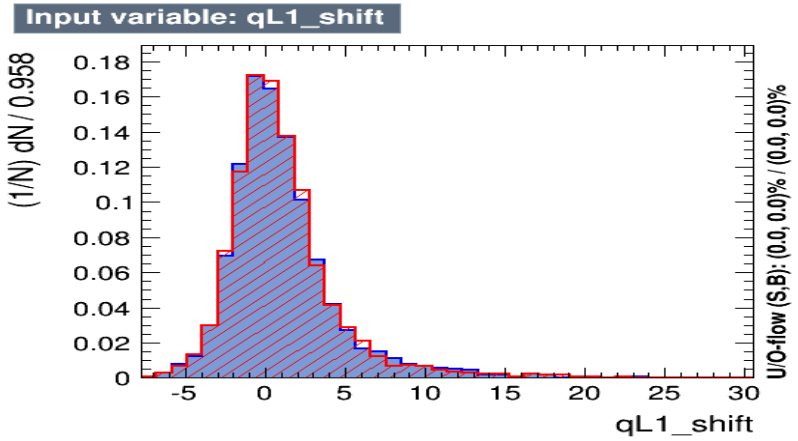


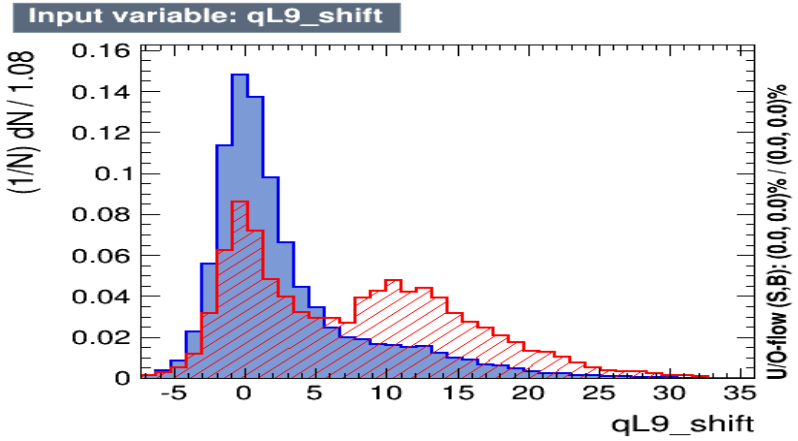


About Tracker Pattern InnerL1

- 3 Traker Pattern: InnerL1, FullSpan, InnerL9 (TotalMC events: 1740467; InnerL1: 198042; InnerL9: 794695; FullSpan: 747730)
- Code in /afs/cern.ch/user/c/czhang/public/CCEleCode_AllP at make the BDT training for each kind of tracker pattern, which could be used for test.
- The data with InnerL1 tracker pattern has the worst BDT training result. Mainly due to L1 charge has quite small contribution to BDT training.







Introduce of Electron charge confusion Code

<InDataDir> is the directory of Your Data.

<InDataName> is the name of Your Data.

Energy independence correction:

- Directory: Codedir/ValueDis : ValueDisTrkPat.C operateCutFlu xTrkPat.sh
- Directory: Codedir/ValueDis/Draw : RunTrkPat.C operateTrkP at.sh

[1] cd ./ValueDis; sh operateCutFluxTrkPat.sh Orignal corrMCISS InnerL9 all <InDataDir> <InDataName>

[2] cd ./ValueDis/Draw; sh operateTrkPat.sh OrignalStatisRig InnerL9 corrMCISS <InDataName>

[3] cd ./ValueDis; sh operateCutFluxTrkPat.sh IndepentStatisRig corrMCISS InnerL9 all <InDataDir> <InDataName> ==> Create filter data after energy correction. < Filter Data with correction >

BDT training:

Directory: Codedir/ BDTtraining : ROOTCC.C operateTraining.sh

Directory: Codedir/ BDTtraining : TMVACCFilter.C operateTMVACCFilter_MultiRun.sh

[4] cd ./BDTtraining; sh operateTraining.sh TightcorrMCISS InnerL9 reweight <InDataName> ==>Training and get weights

[5] cd ./BDTtraining; sh operateTMVACCFilter_MultiRun.sh TightcorrMCISS InnerL9 all reweight <InDataName> ==>Create tmva_bdtg for all events with cut. <Finnal result>

Code operation

- **Just use the weights already in the code, only thing need to do is run the EXE/operate.sh.(Process: [3],[5])**
- **Make BDT training to get the weights and create tmva_bdtg for each events: Process [3] , [4], [5].**
- **Process with changing cut: change cut in ./ValueDis/ValueDisTrkPat.C ---> [1],[2],[3] or just [3] is fine ---> [4] ---> [5].**