

Progress on PID electors

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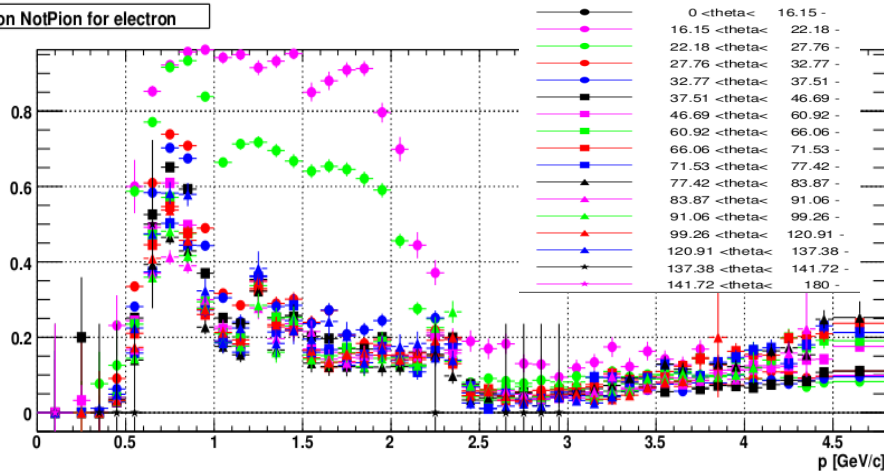
- ▶ New table based selectors
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- ▶ New Table based electron KM selectors
- ▶ New Table based Proton LH selectors
- ▶ Anti electron Likelihood selector

Motivation

As you can see efficiency of the PID selectors is a function of theta. In old tables we have just 3 theta regions (good approximation for kaon and pion) – Forward , Barrel , Backward.

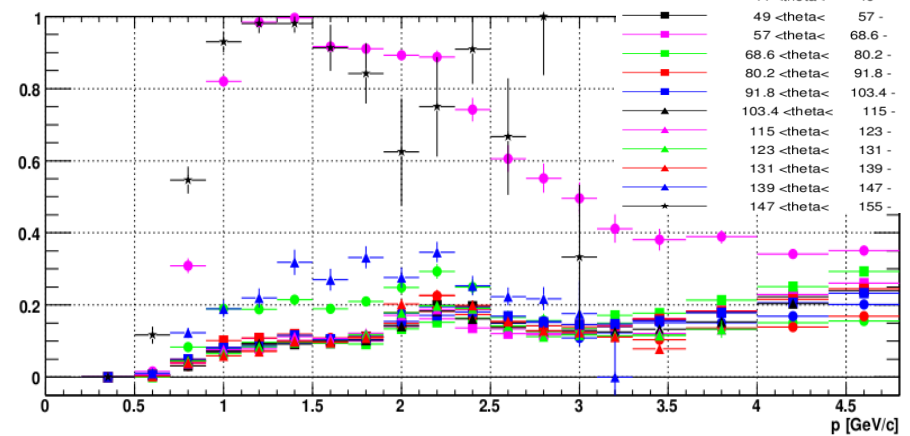
Kaon not a pion for different p, theta (Babar tables)

Kaon NotPion for electron



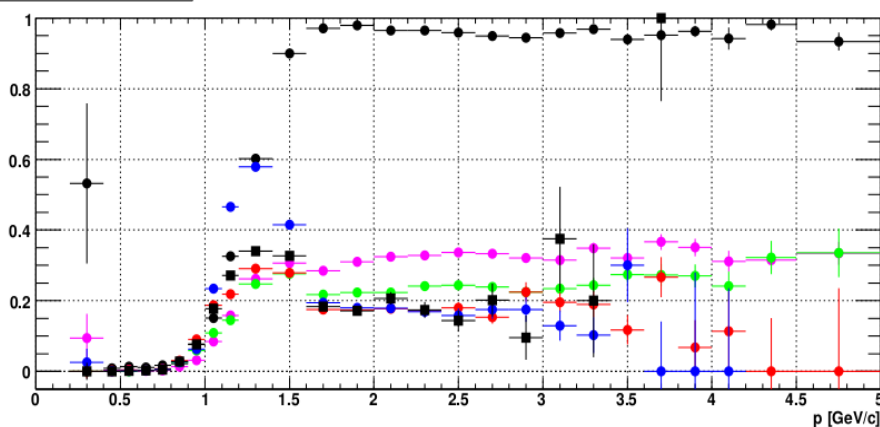
electrons

Kaon NotPion for muon



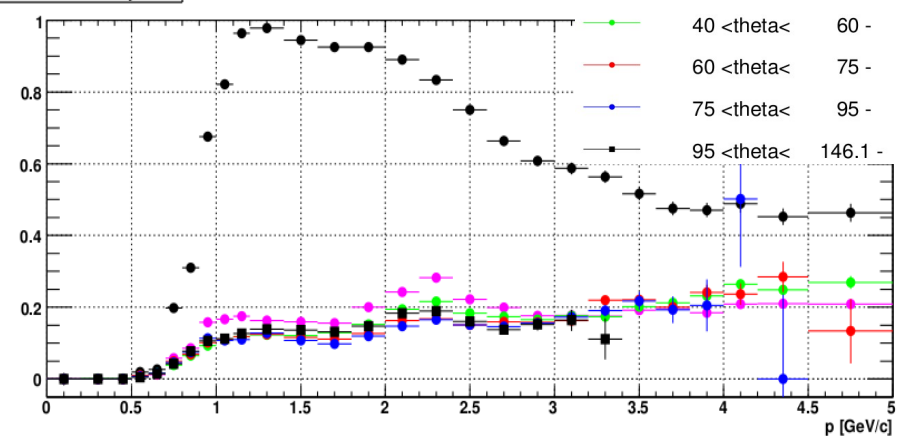
muons

Kaon NotPion for proton



protons

Kaon NotPion for pion



pions

Implementation in FastSim

- Due to different number and size of the theta and momentum bins structure of the new tables is very different from old. So different function need to be used to read them
- New Class **TableReader** was written to read tables

TableReader::ReadNewTable(HepString path) – to read new tables

TableReader::ReadOldTable(HepString path) – to read old tables

TableReader::GetAcceptProb(double p, double theta, PdtPid::PidType partID) – return probability to be accepted

To read new tables newTableFlag = true in PacPid<Particle>Sequence.tcl

All new tables are here:

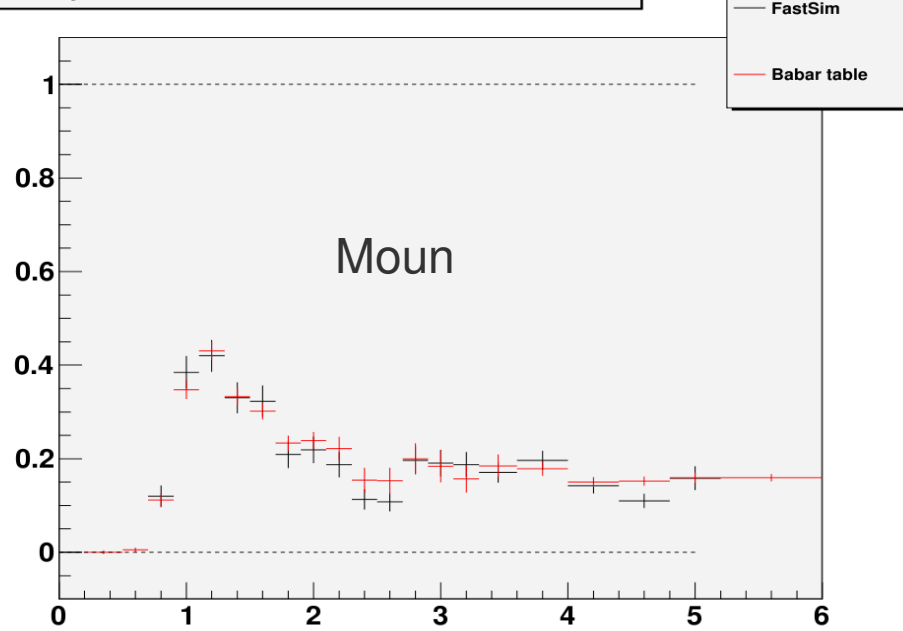
PacPidCalib/PidTables/TablesNew7feb2010/

New Tables

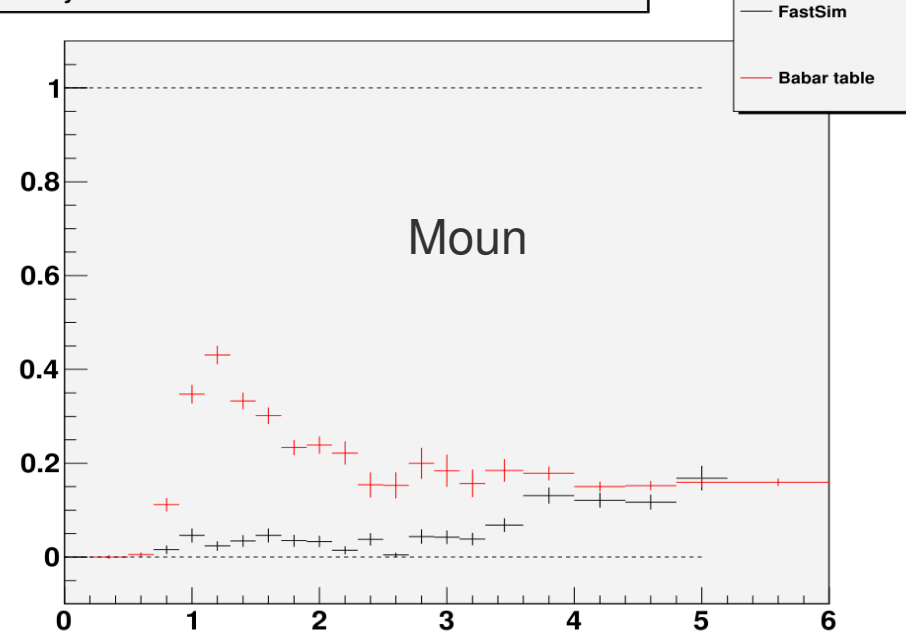
Validation

Old Tables

KVeryLoose Table based $17 \leq \Theta < 25$ for muon

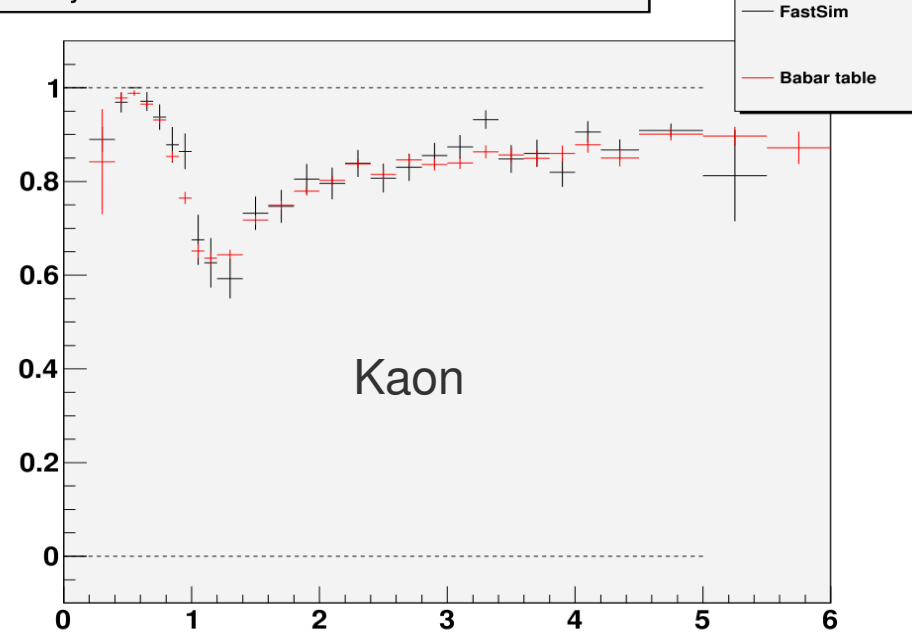


KVeryLoose Table based TOF $17 \leq \Theta < 25$ for muon

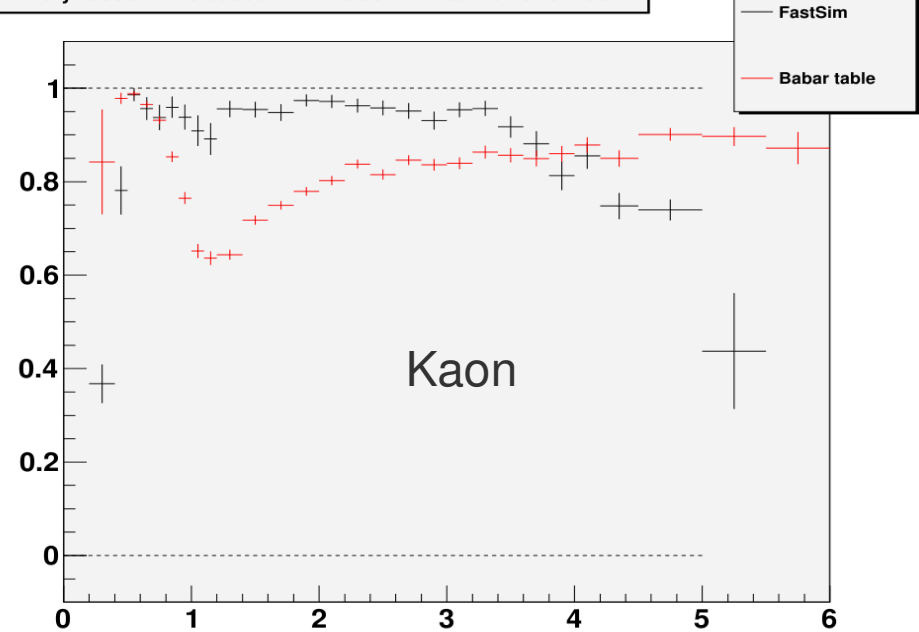


Kaon Very Loose

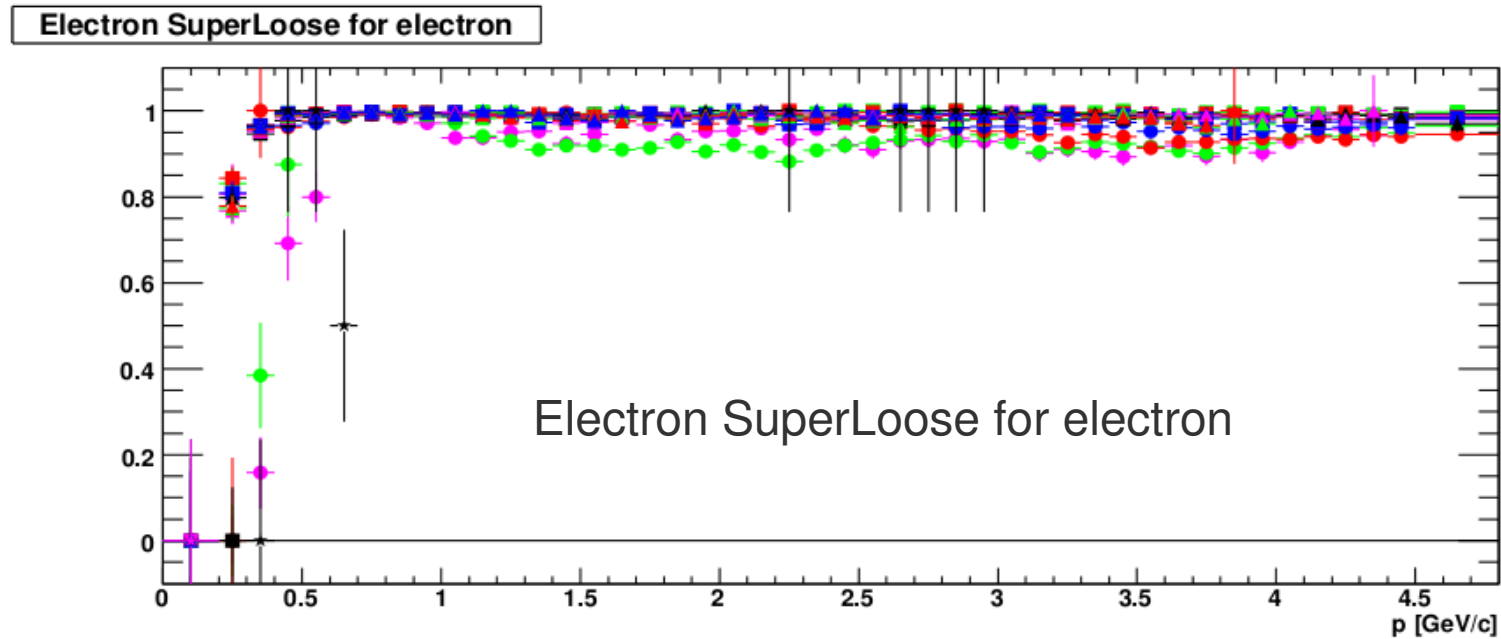
KVeryLoose Table based $20.05 \leq \Theta < 25.78$ for kaon



KVeryLoose Table based TOF $20.05 \leq \Theta < 25.78$ for kaon



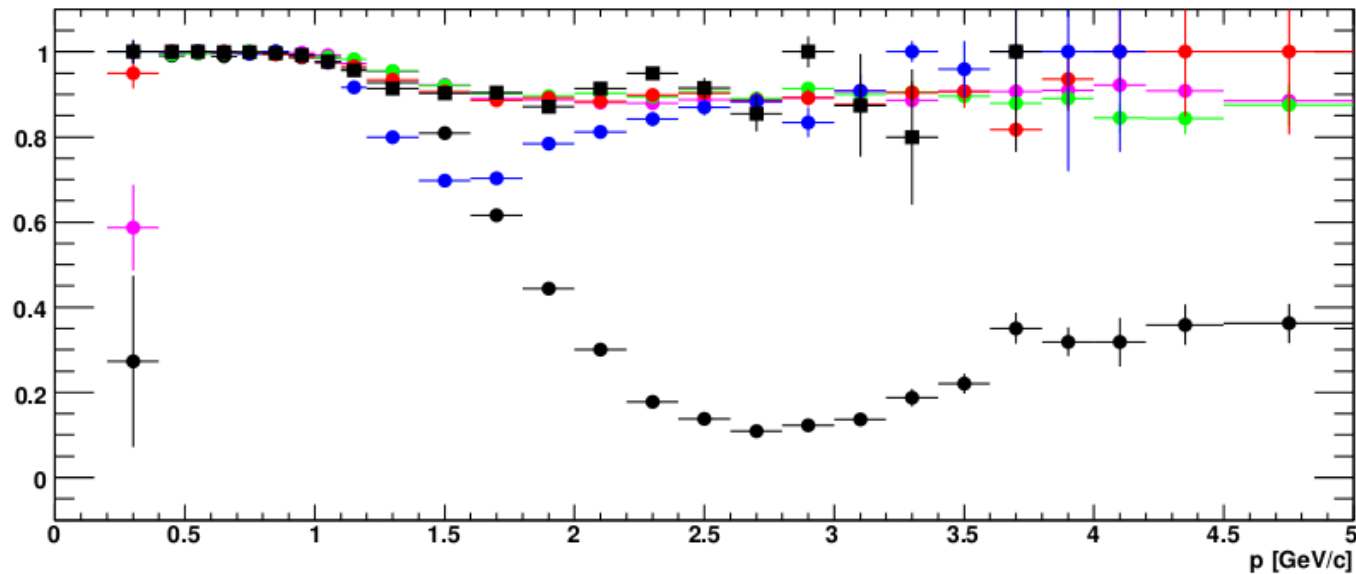
New Table based electron KM selectors



●	0 θ	16.15 -
●	16.15 θ	22.18 -
●	22.18 θ	27.76 -
●	27.76 θ	32.77 -
●	32.77 θ	37.51 -
■	37.51 θ	46.69 -
■	46.69 θ	60.92 -
■	60.92 θ	66.06 -
■	66.06 θ	71.53 -
■	71.53 θ	77.42 -
▲	77.42 θ	83.87 -
▲	83.87 θ	91.06 -
▲	91.06 θ	99.26 -
▲	99.26 θ	120.91 -
▲	120.91 θ	137.38 -
★	137.38 θ	141.72 -
★	141.72 θ	180 -

New Table based Proton LH selectors

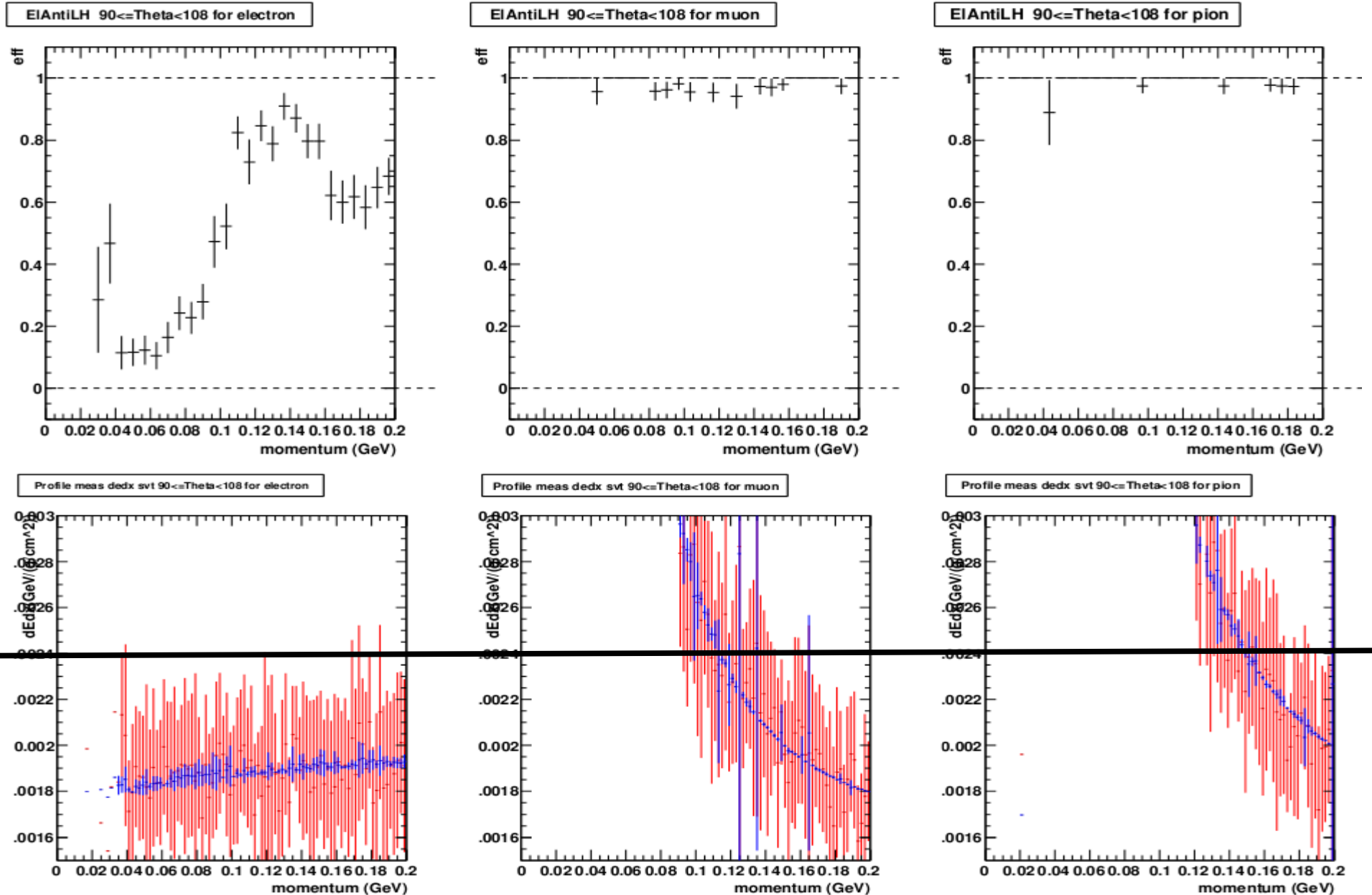
ProtonLH Loose for proton



	20.05 <theta<	25.78 -
	25.78 <theta<	40 -
	40 <theta<	60 -
	60 <theta<	75 -
	75 <theta<	95 -
	95 <theta<	146.1 -

Anti electron Likelihood selector

- ➔ We construct this variable: $R_ELvsAll = LH_el / (LH_el + LH_mu + LH_pi + LH_k + LH_p)$
- ➔ We ask $R_ELvsAll$ to be < 0.95
- ➔ This selector can be improved by constructing several ratios (R_ELvsMu and R_ELvsPi)
 $R_ELvsMu = LH_el / (LH_el + LH_mu)$ $R_ELvsPi = LH_el / (LH_el + LH_mu)$



Conclusions

- New Tables where constructed and tested
- We add: 6 new electron KM selectors (table)
4 new proton LH selector (table)
1 anti electron LH selectror (real)
- Need to commit the code