

# **PID** Again

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# A Compromised Solution

- $P_x^A$ : Probability for non – electron pass cer cut  
 $P_e^A$ : Probability for electron pass cer cut  
 $P_x^B$ : Probability for non – electron pass ep cut  
 $P_e^B$ : Probability for electron pass ep cut
- Since clean sample can be selected from Calorimeter, so  $P_x^A, P_e^A$  can be calculated
- $x$ : number of non-electrons
- $e$ : number of electrons
- $N_i$ : number of events with different cuts

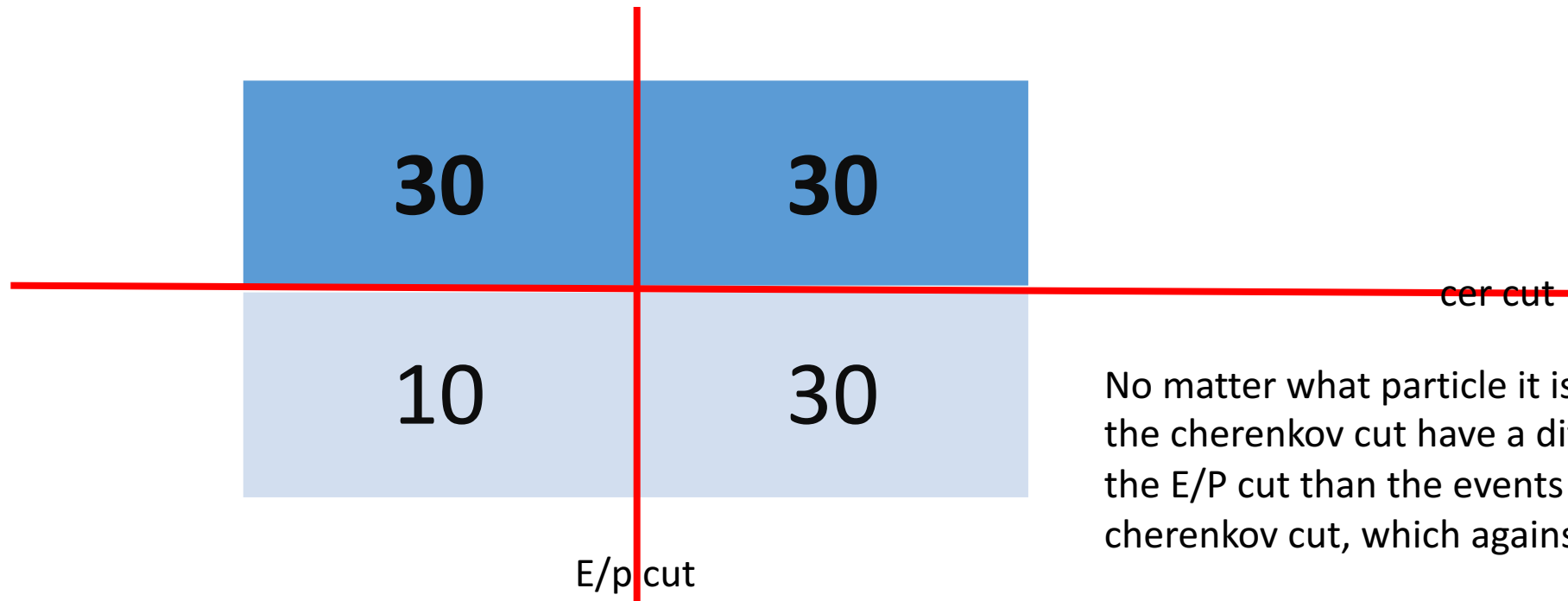
Cut A	Cut B	Relations *
X	X	$x + e = N_0$
✓	X	$P_x^A x + P_e^A e = N_1$
X	✓	$P_x^B x + P_e^B e = N_2$
✓	✓	$P_x^A P_x^B x + P_e^A P_e^B e = N_4$

← 4 equations to solve 4 Variables

\* General Good Electron Cut has been applied

# Some discussion left from Last meeting

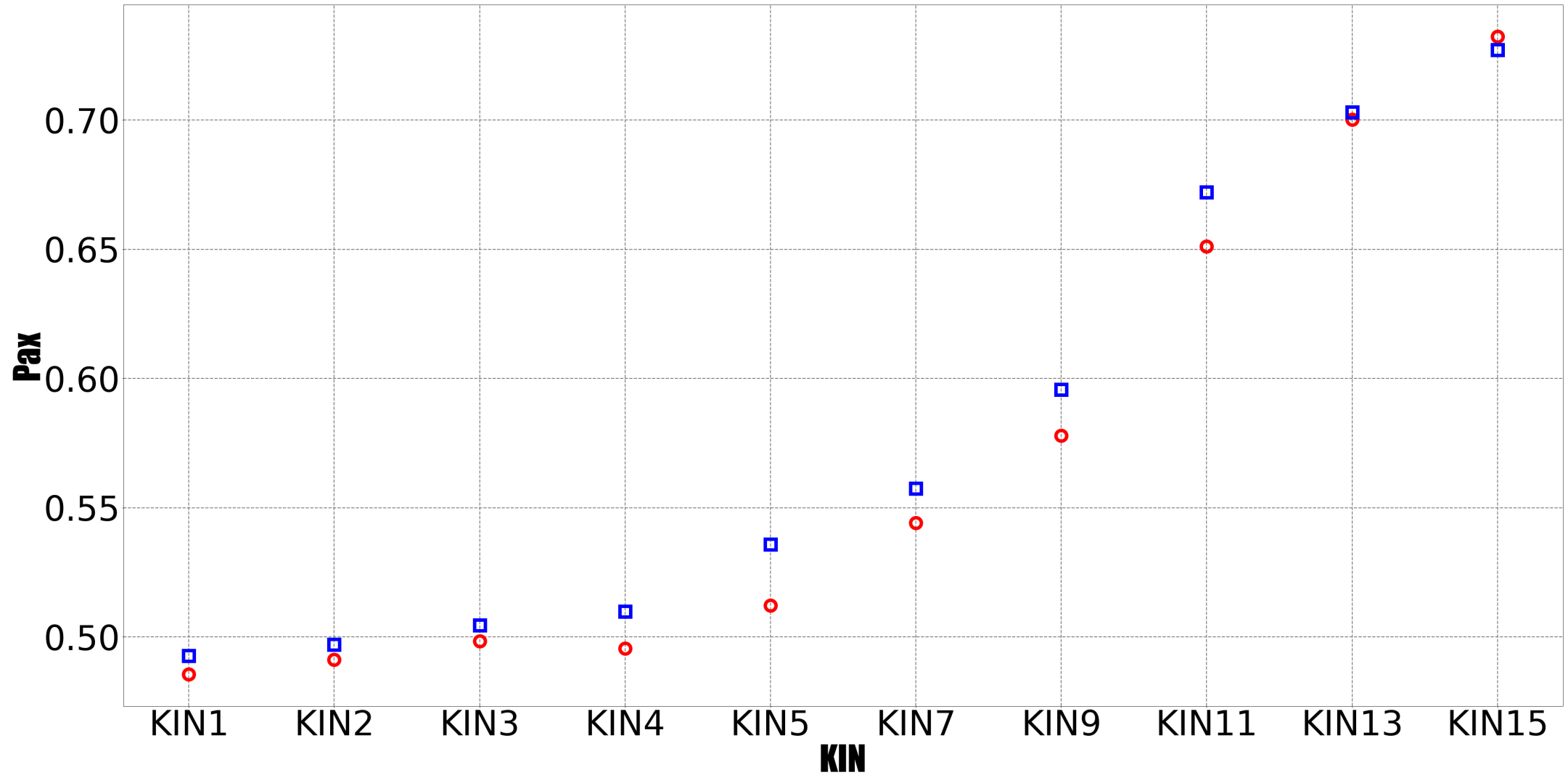
- Cherenkov and PRL work **independently Independently Independently**
- Independently:
  1. For any kind of particle, its behavior in the detector A does not effect the its behavior in the detector B
  2. The total efficiency  $P=P_A * P_B$

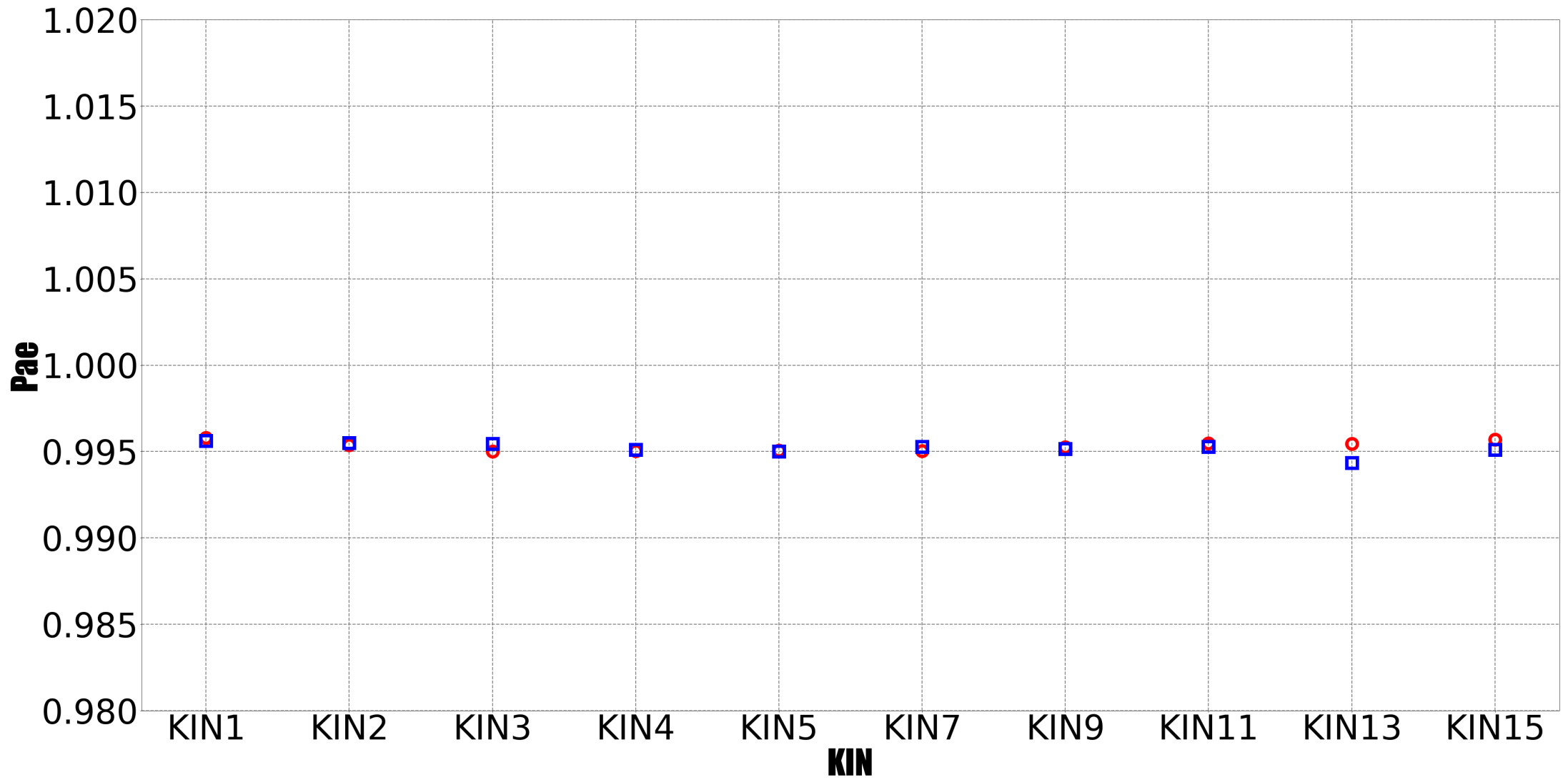


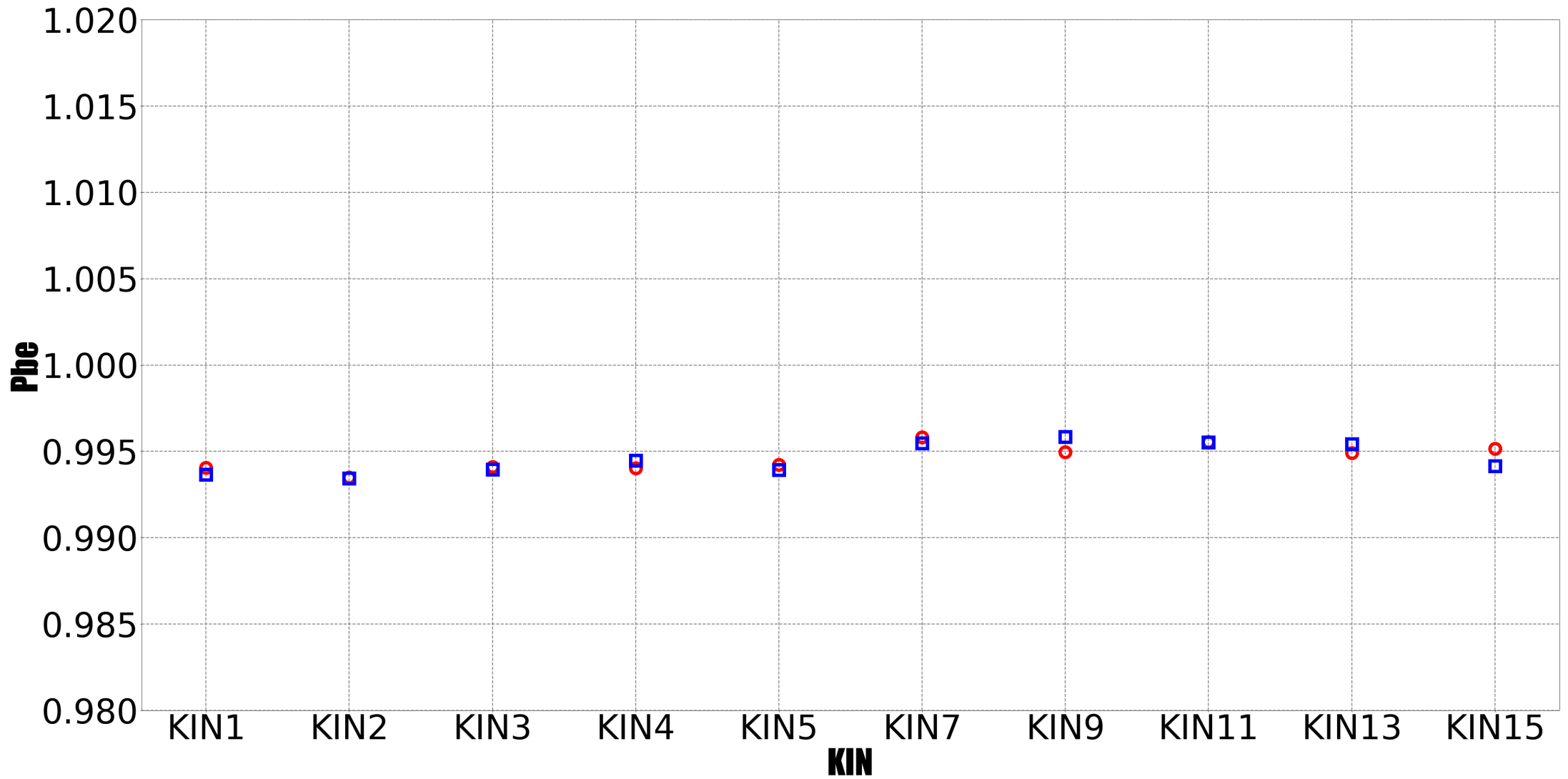
No matter what particle it is, the events that can pass the cherenkov cut have a different probability to pass the E/P cut than the events that do not pass the cherenkov cut, which against the independently rule

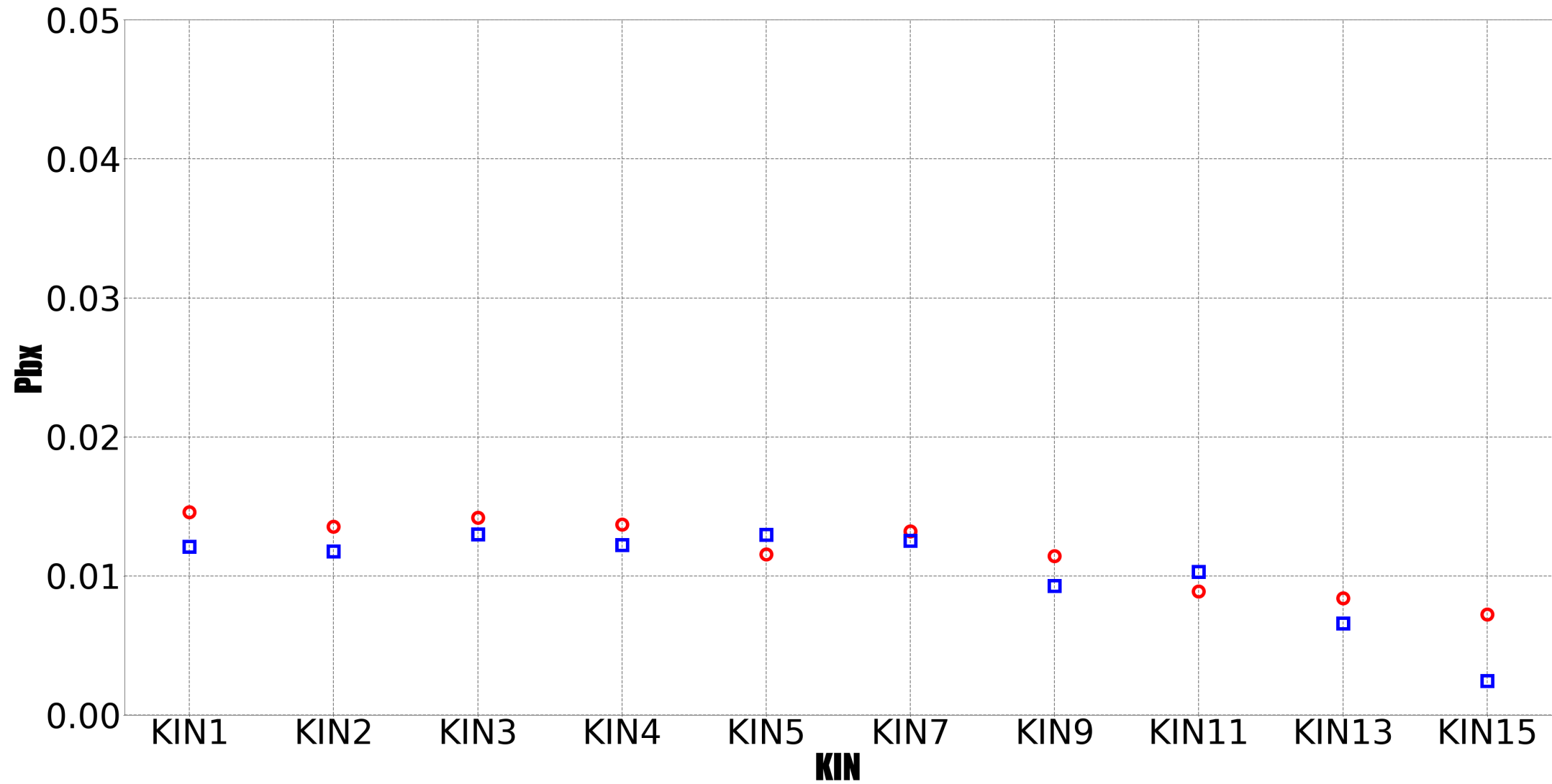
Blue Marker: Helium-3

Red Marker: Tritium

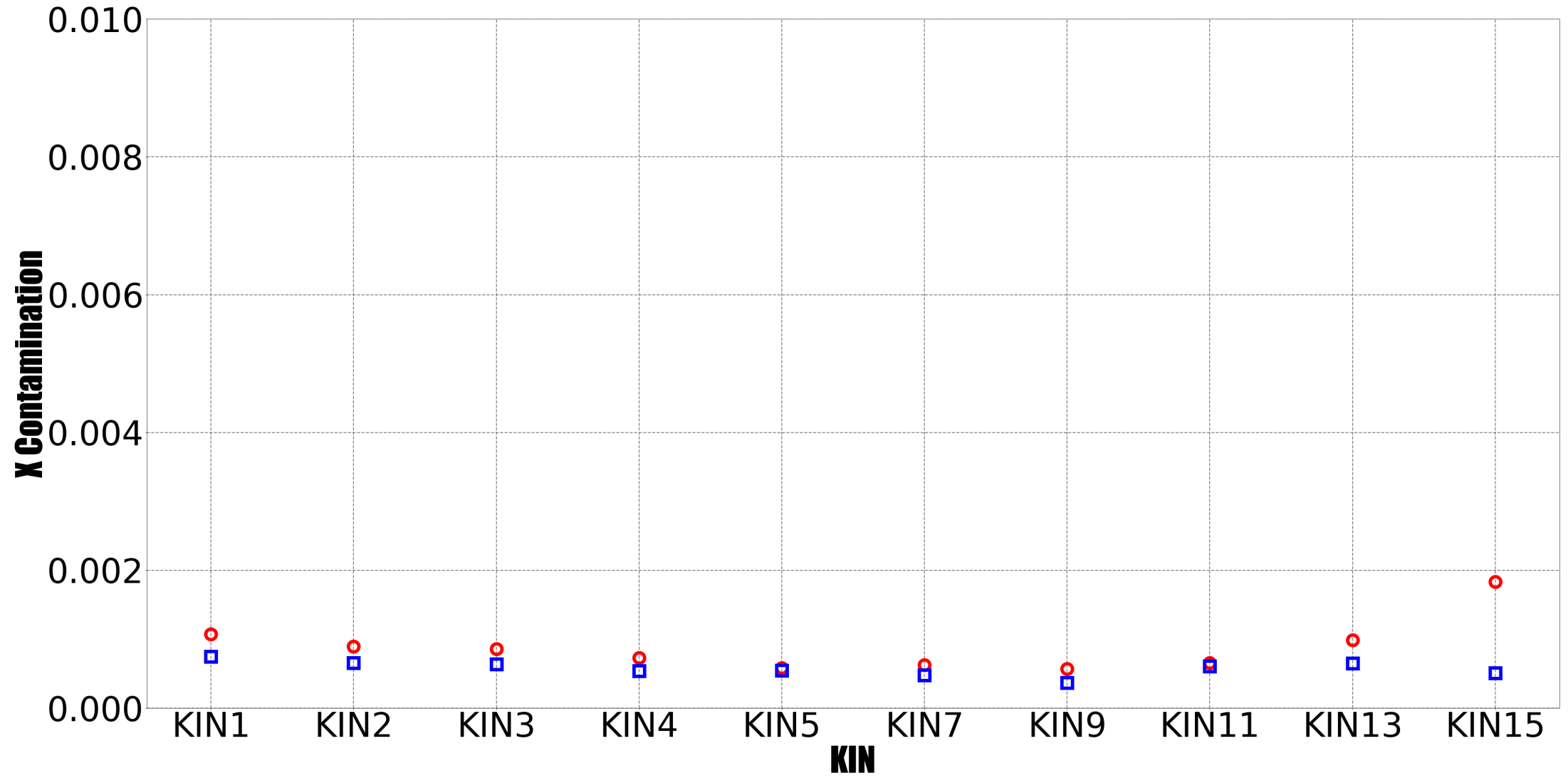






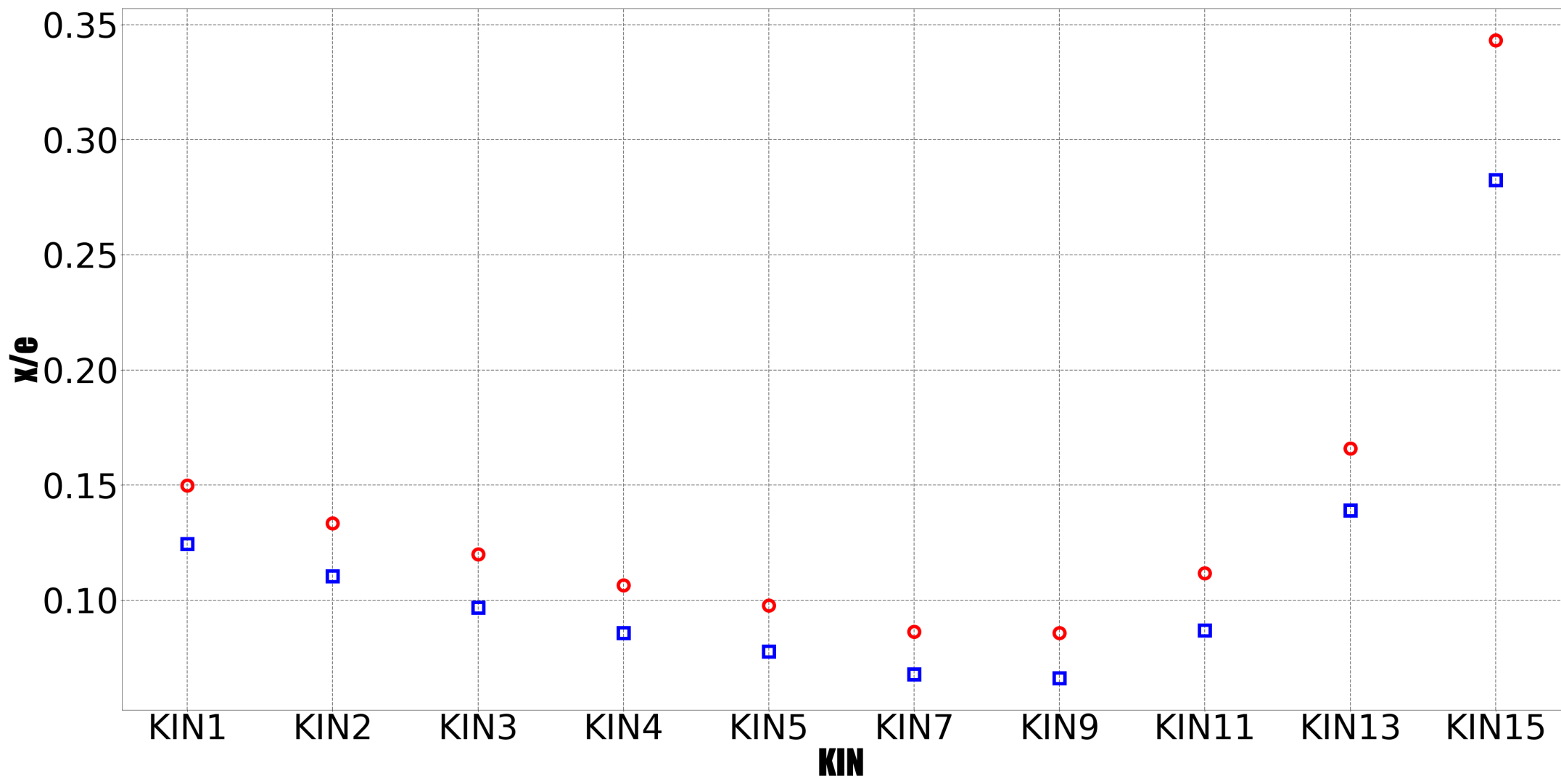


True\_electron=e\*Pae\*Pbe  
False\_electron=x\*Pax\*Pbx  
X Contamination=False\_electron/True\_electron

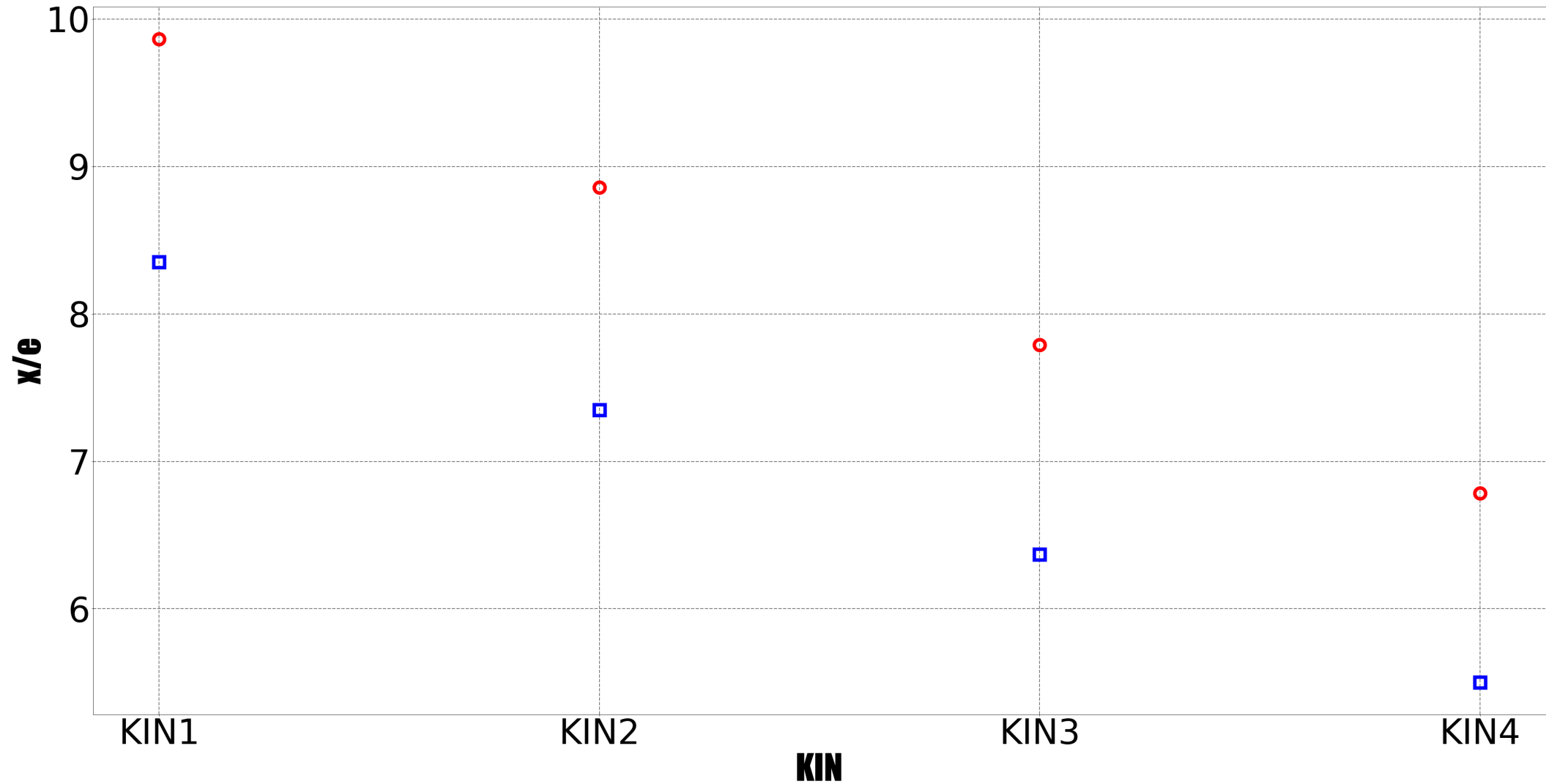




# x/e under T2 trigger



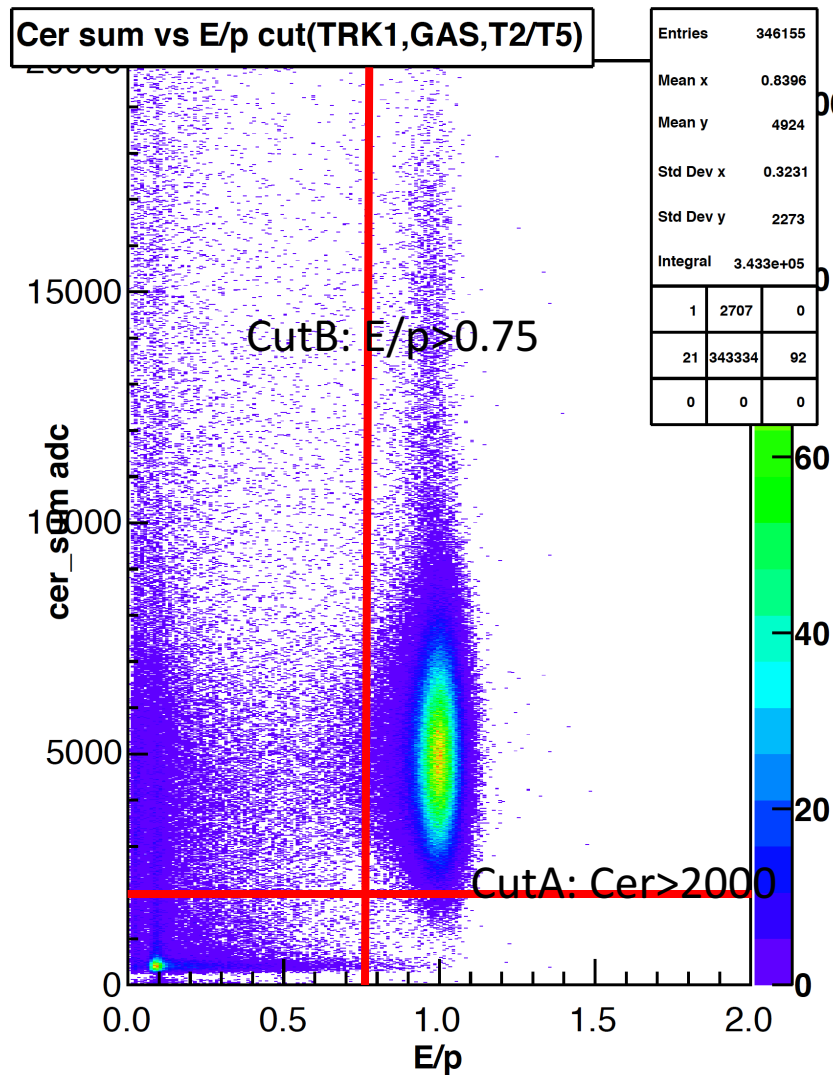
# x/e under T1 trigger



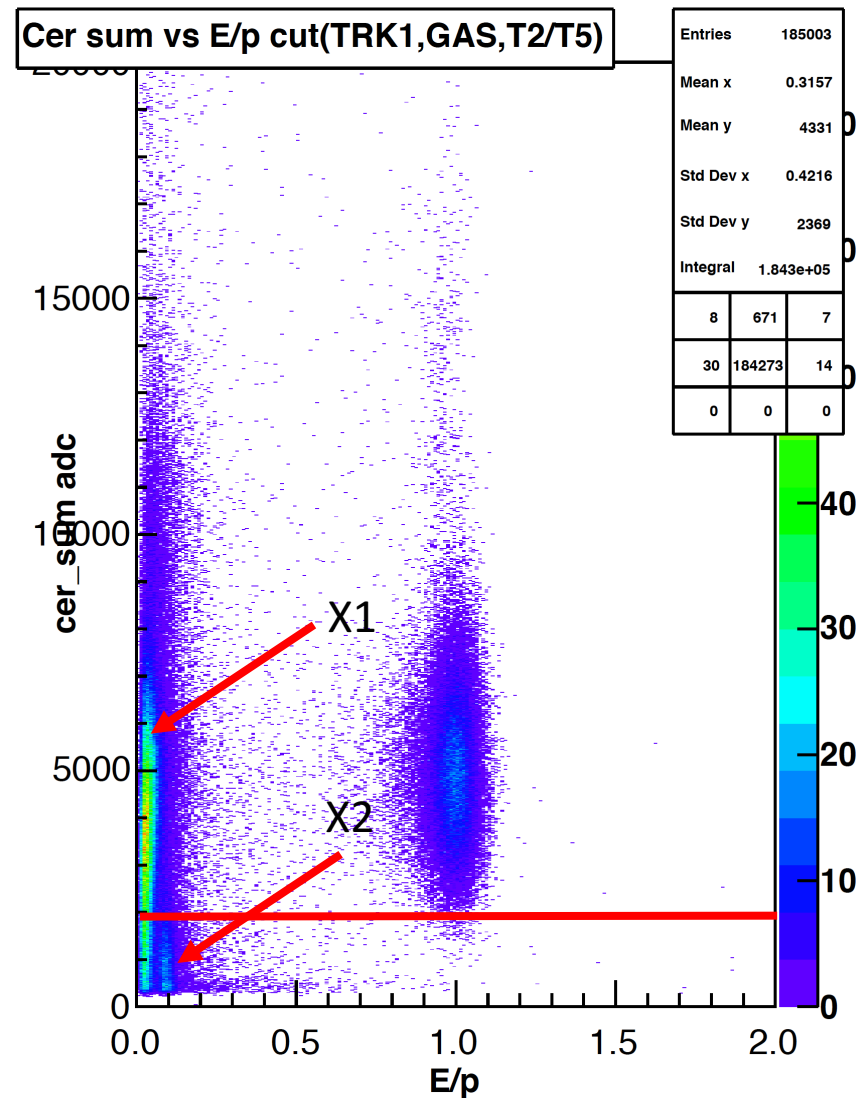
**BACK UP**

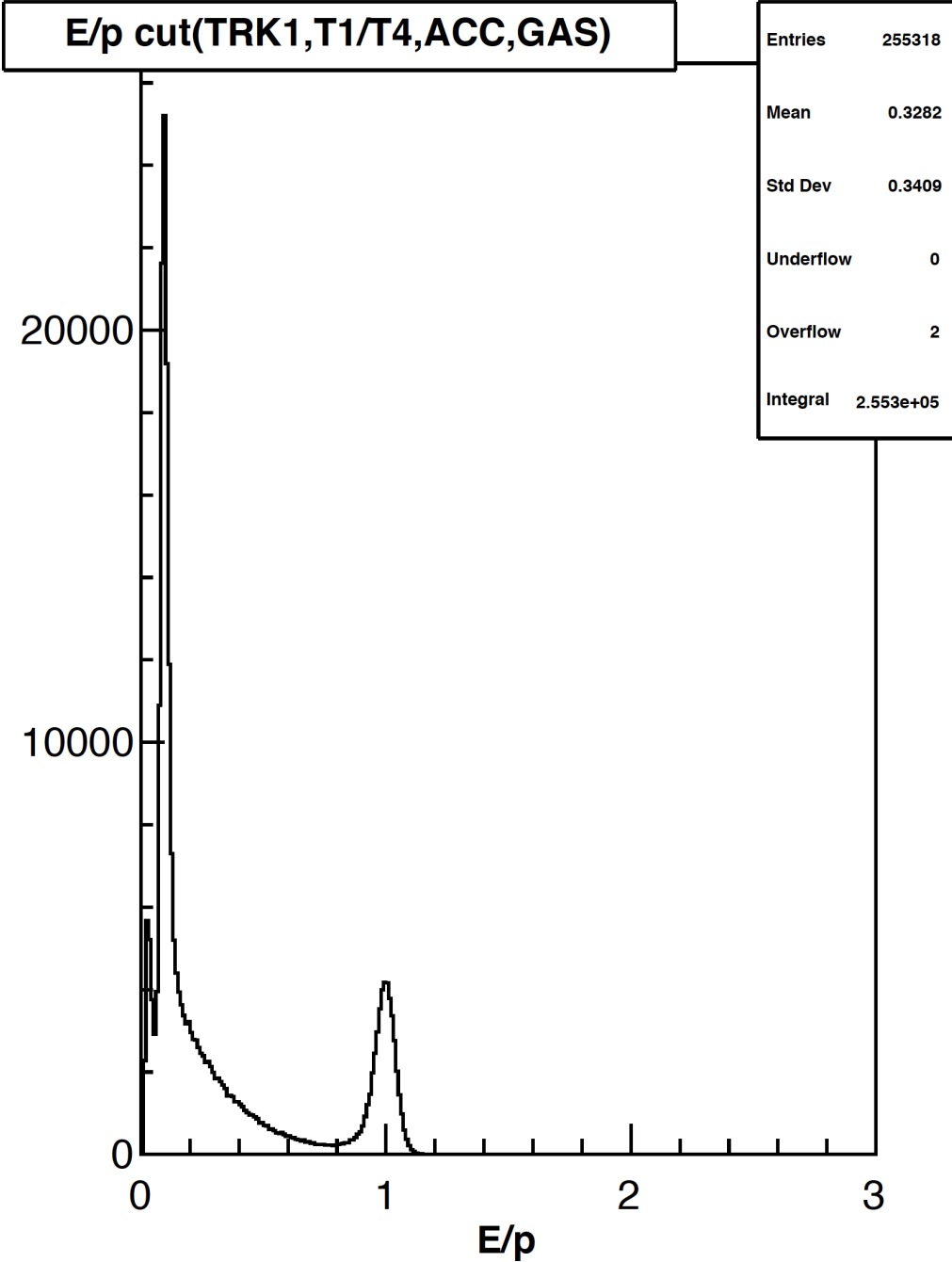
# MARATHON PID difficulty

## KIN1

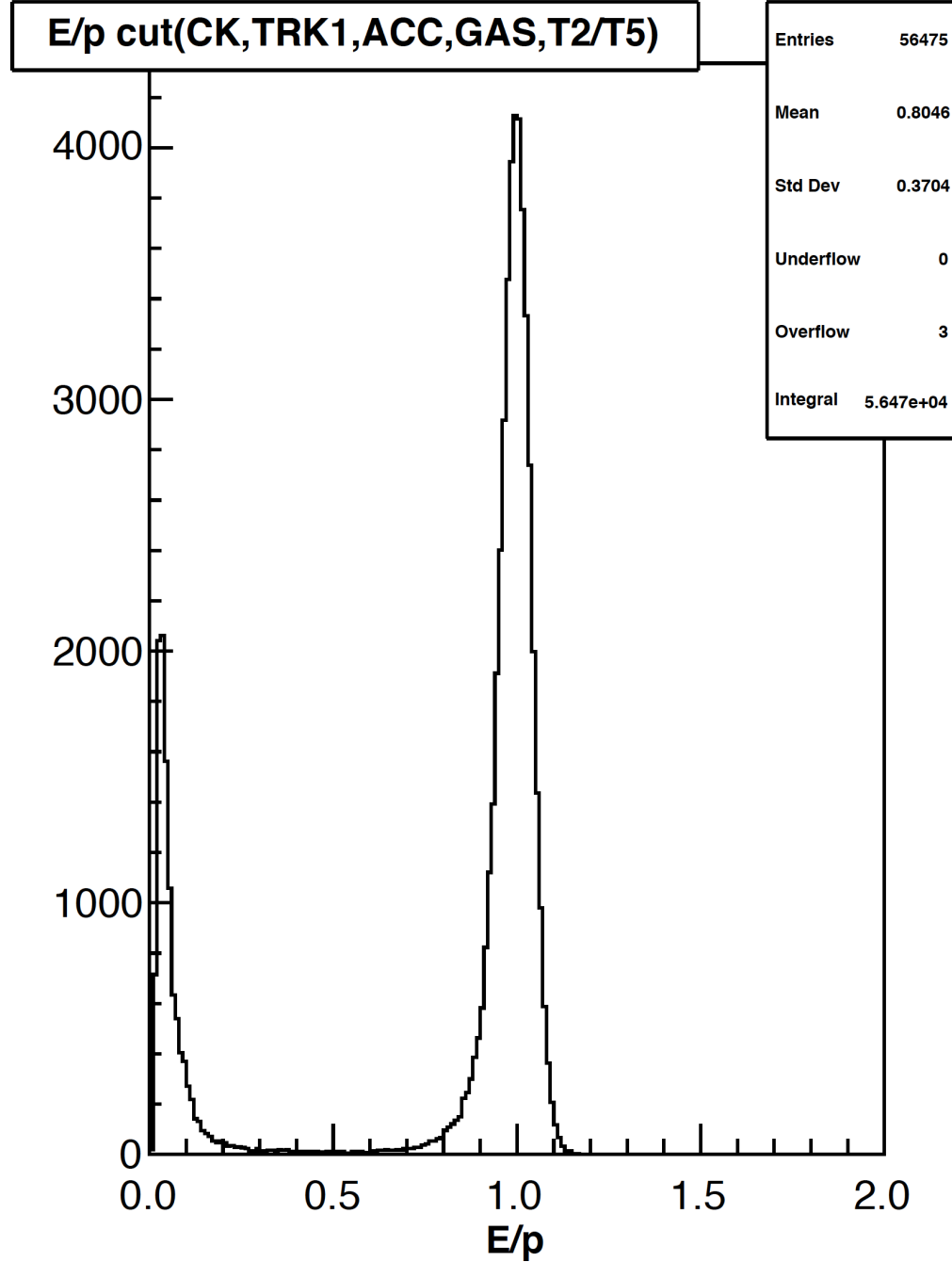


## KIN15





**3 different Signals can be observed in Calorimeter**



**Cherenkov cut can suppress on of them**