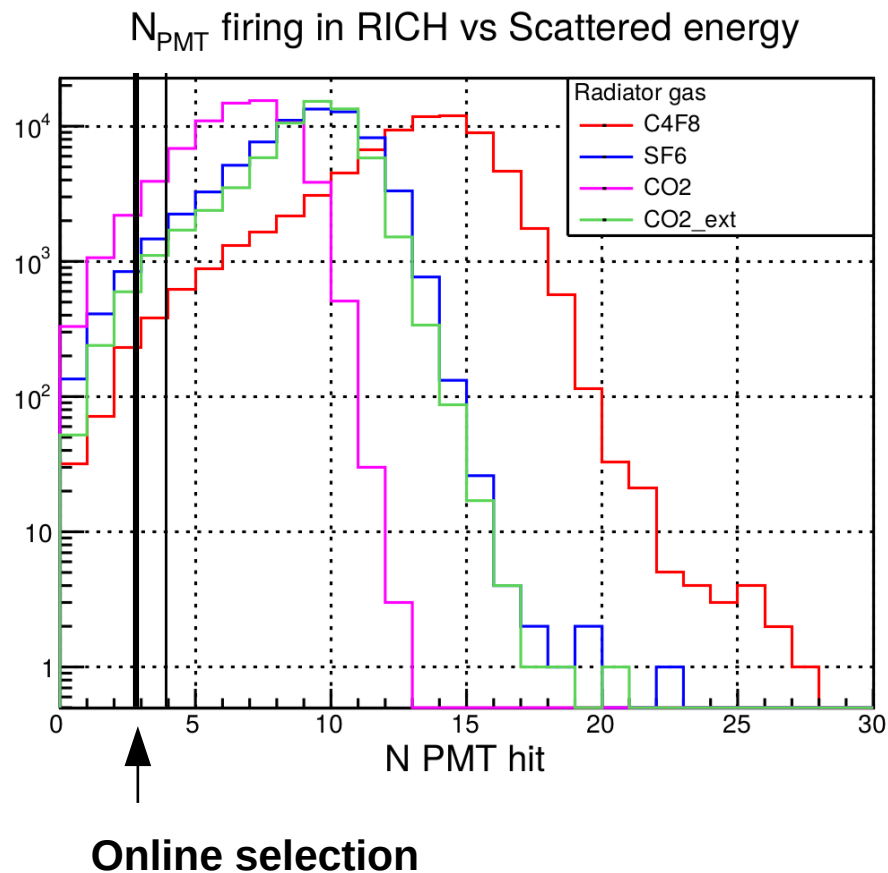


Trigger logic for TDIS electron arm (first look)

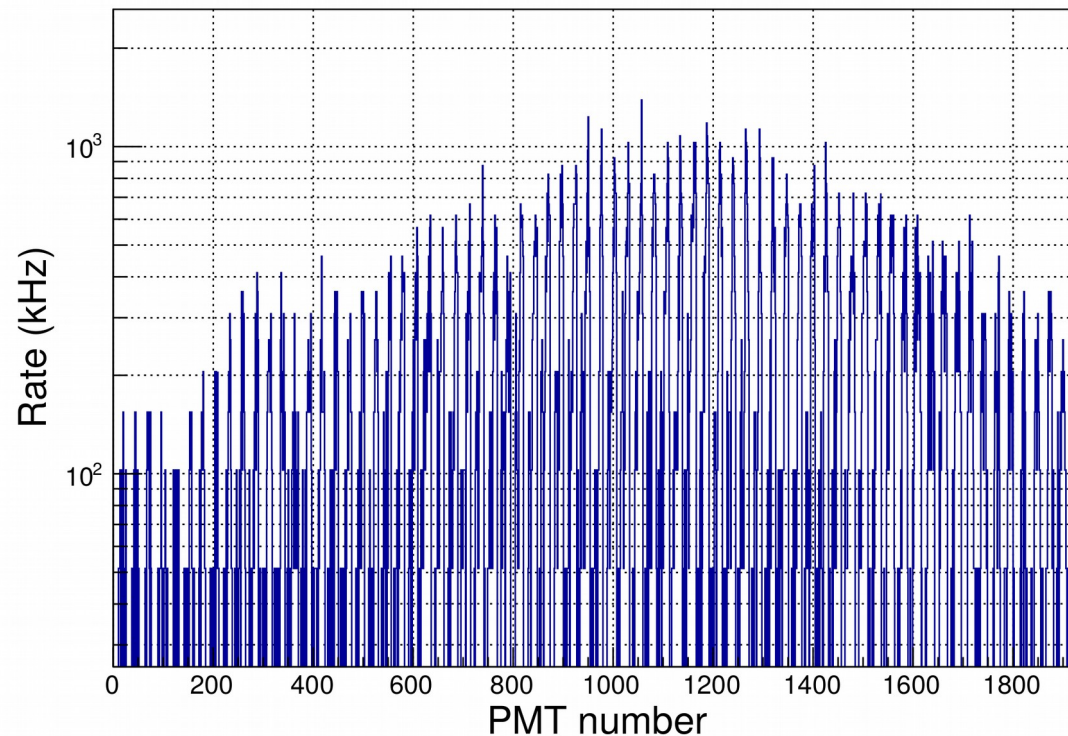
Reminder: the electron selection for the RICH was set to 4 PMTs firing on offline. Presumably, we want to set a even looser selection in the trigger logic (say 3 PMTs)



Trigger logic for TDIS electron arm (first look)

With 160 kHz average in each PMT induced by the beam, and we take a 30ns window to make a coincidence, each PMT will have a 0.5% chance of firing;
If we take the coincidence of all 1938 PMTs, it is mostly certain that at least 3PMTs will fire, so we need to use the correlation between the LAC and the RICH

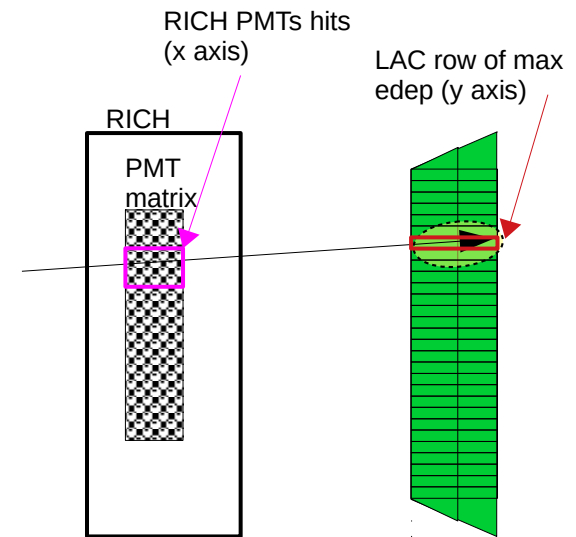
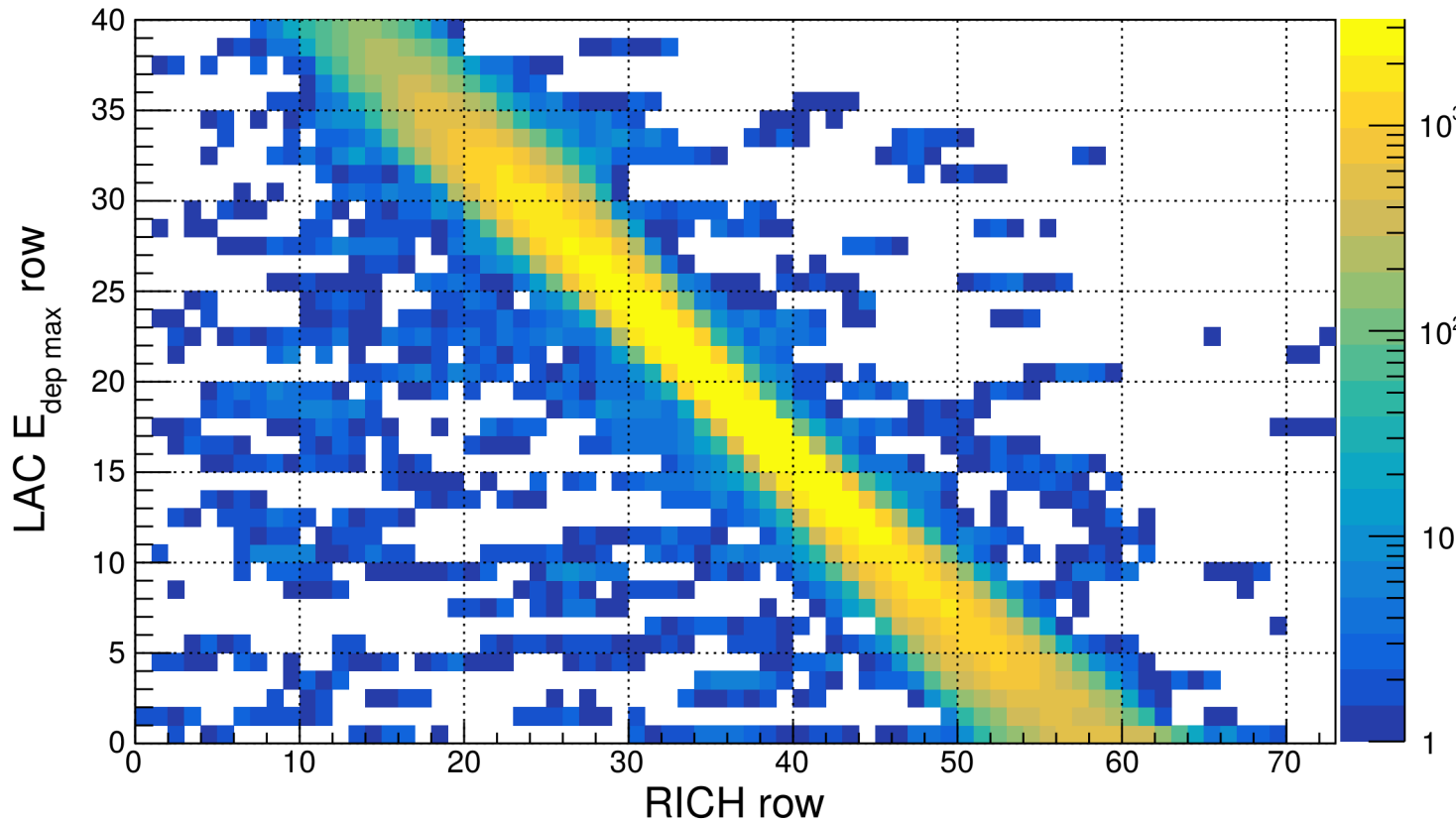
H_2 , $I_{\text{beam}} = 50 \mu\text{A}$: Average PMT rate = 160.12 kHz



Trigger logic for TDIS electron arm (first look)

On a first look, we may have subsets of 5 to 7 PMT rows associated to each LAC row (each row having 27 PMTs).
Within a 7 PMT rows subgroup, the probability for at least 3 PMTs to fire within a 30ns window is reduced to 6%

LAC vs RICH dispersive direction



Trigger logic for TDIS electron arm (first look)

TODO:

- sort out the trigger details for the LAC itself:
 - * what should be the typical size of the cluster?
 - * what will be the size of a trigger group in the LAC?
 - * how to effectively use the information from inner/outer LAC?
- figure the detailed map between LAC trigger groups and RICH PMTs;
- evaluate the additional background due to “LAC trigger” + “accidental RICH trigger”