Reorganize the Container PMT Testing Data

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motivation

Due to complex of PMT testing procedure and upgrades of hardware and software, the raw data of PMT testing is not user-frinedly.

It is a good choice to produce a uniform structure to re-organize and store the raw data.

preliminary consideration

The minimum "object" of our container testing is drawer-test rather than a spefcific PMT[1].

the propertites:

1. uniq testing number
2. validity of the data

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[1]since one PMT could be tested several times in different drawers due to failure of peformance test

calibration of each drawer

one root filesore the raw data, with branches:
0.1pewave,1pewave,ttswave,ttstrig,dcr,

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a unique ID indicate the key info
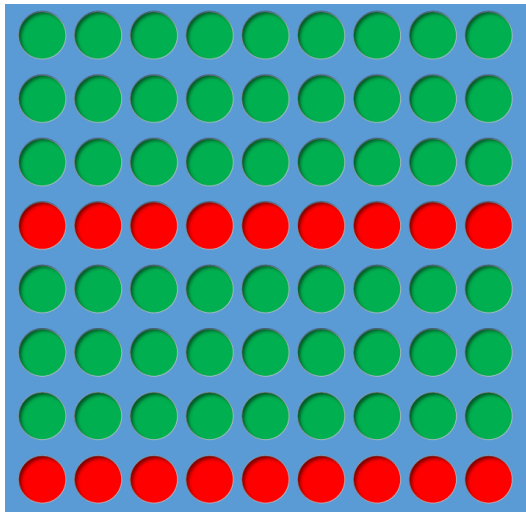
how to calibrate

The HAMAMATSU company has provided us with QE value of part of the PMTs, If we suppose the collection efficiency is same for all the HAMAMATSU PMTs we could use these QE values to calibrate drawers in the container.

In order to make sure the PDE-μ_{test} fitting results reasonable, only the PMT pass the test will be used for fitting.
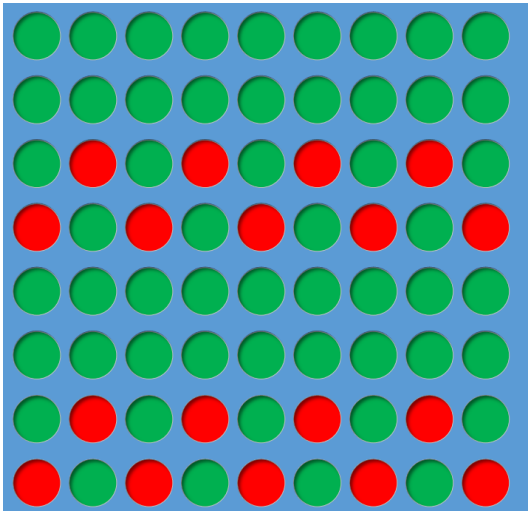
fitting example using 30 tubes
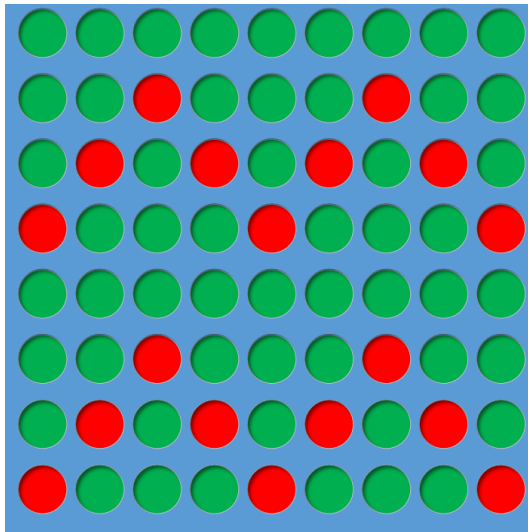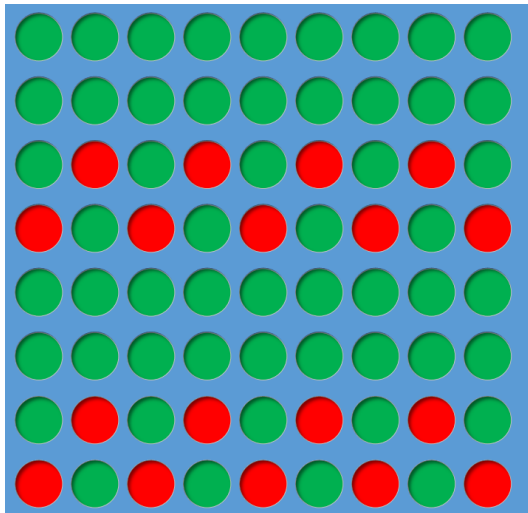
drawer$_{factor}$ vs. PMT number drawer

more results can be found in the back-up part.

discuss the results

the relative error $e_r = \frac{f_i - f_r}{f_r}$ of one draw:

discuss the results

This means we need to calibrate each drawer with at least 30 PMTs to

JUNO offline

compare detector performance with the different PMT paterns,
especially the time and energy resolution and reconstruction results.
how to:add method to the PMT class then each PMT can get its
performance according to the layout pattern and its own ID.

HAMAMATSU PMTs

the PDE uniformity of HAMAMATSU PMTs are not so good
we can artificially correct the PDE if these PMTs have fixed orientation
and we can extract the light incident angle using reconstraction
information.

Thank You