# Converting the PMT Container Testing Raw Data to ROOT File Format

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# Outline

# motivation

1. The Raw data of PMT testing is significant for the evaluation of PMT performance.
2. **While,Currently, the raw data of container system is not well organized and it is not convinent for people to get a quikly access.**
3. It is useful to convert all the testing raw data to ROOT format.
   - decrease the file size
   - easy to analysis and manage.
   - shadow the hardware details.

# requirements

1. sotre the raw waveform data(.1pe, 1pe, TTS).
2. store the auxilary testing information(container , mass, HV, DCR. etc).
3. easy to manage (create, modify and update) and analyze.
4. one ane acquire almost all the data needed for analysis(of one PMT) from only one file rather than collecting the details from server.

beloew is the figure about

# prliminary file structure and stretages

- each PMT have one root file named in ”SN_rawdata.root”
- In a specific root file, we have several trees and a auxilary data class
- if one PMT go through several tests in the container, all the data will be saved still in only one root file but with different name of trees[1].

[1] distiguished by a unique tag

# results

current file path: the folder MCP contains all the MCP PMT data files;
the folder HAMAMATSU contains all the HAMAMATSU data files;

# example C++ code of reading the file

listing figure

# summary

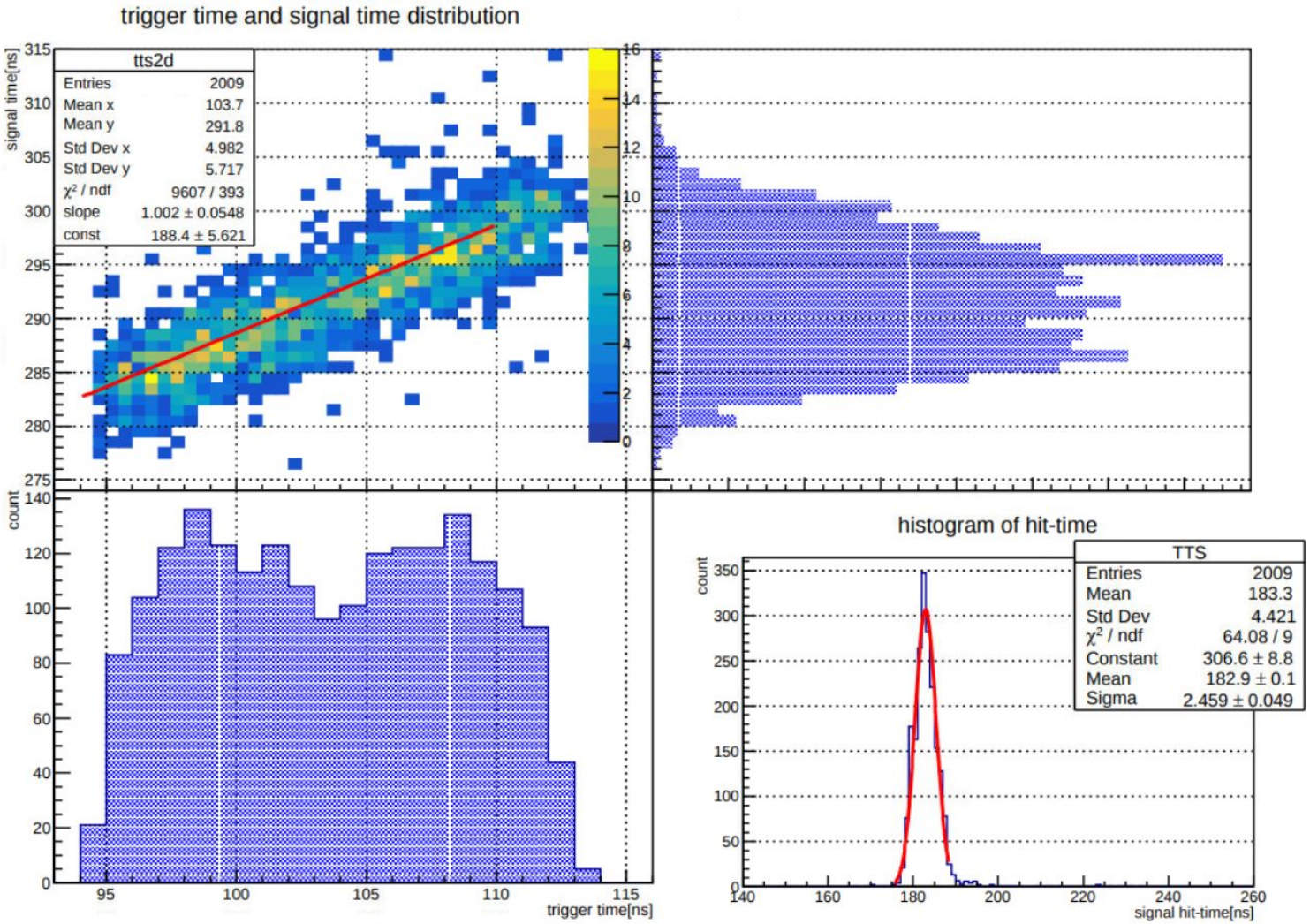
- the charge and amplitude stability of HAMAMATSU PMT is better.
- ∼6k NNVT PMTs and 5k HAMAMATSU PMTs has been tested in container system, test results and test reports are avaliable from PMTDataBase[2].
- we reject or accept one PMT according to its perfomance test results from container and scanning station.
- we need to study the ”delay signal” of HAMAMATSU PMT and ”big signal” of NNVT PMT[3] in detail[4].
- the expected mean PDE value is 30.4% and mean DCR value is ∼34kHz[5] in CD.

[2] pmtdb.juno.ihep.ac.cn
[3] especially when PMT working in the multi-photon case
[4] one option is to transport several PMTs to SYSU for detailed study
[5] will decrease after installation

# THANKS

# BACK-UP

# TTS of HAMAMATSU PMT




图：hittime and trigger time