

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

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# Outline

## ① Motivation

## ② Summary

# 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 convinient for people to get a quickly 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 store the raw waveform data(.1pe, 1pe, TTS).
- ② store the auxiliary testing information(container , mass, HV, DCR. etc).
- ③ easy to manage (create, modify and update) and analyze.
- ④ one can acquire almost all the data needed for analysis(of one PMT) from only one file rather than collecting the details from server.

below 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<sup>1</sup>.

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<sup>1</sup>distiguated 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

## summary

- the charge and amplitude stability of HAMAMATSU PMT is better.
- $\sim 6k$  NNV T PMTs and  $5k$  HAMAMATSU PMTs has been tested in container system, test results and test reports are available from PMTDataBase<sup>2</sup>.
- we reject or accept one PMT according to its performance test results from container and scanning station.
- we need to study the "delay signal" of HAMAMATSU PMT and "big signal" of NNV T PMT<sup>3</sup> in detail<sup>4</sup>.
- the expected mean PDE value is 30.4% and mean DCR value is  $\sim 34kHz$ <sup>5</sup> in CD.

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<sup>2</sup> [pmtddb.juno.ihep.ac.cn](http://pmtddb.juno.ihep.ac.cn)

<sup>3</sup> especially when PMT working in the multi-photon case

<sup>4</sup> one option is to transport several PMTs to SYSU for detailed study

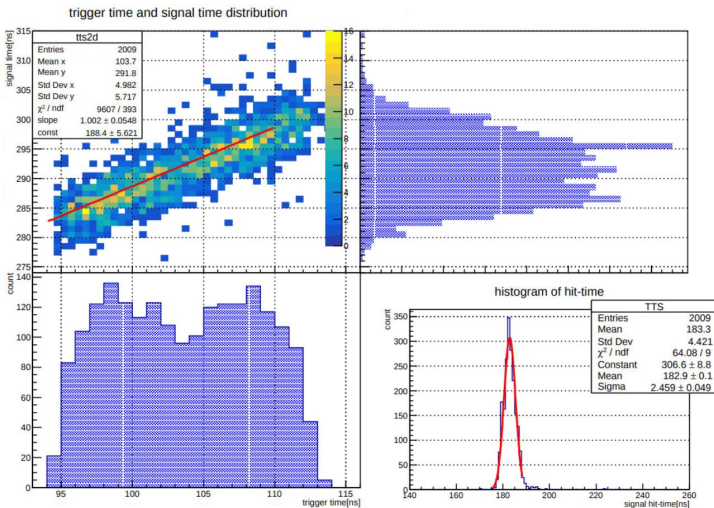
<sup>5</sup> will decrease after installation



# THANKS

# BACK-UP

# TTS of HAMAMATSU PMT



hit-time and trigger time