

Container PMT Testing Data in ROOT format

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introduction

- 1 Onsite server: login.pmt.ihep.ac.cn¹
- 2 raw testing data path:
/pmtfs/disk01/container_data/Measurements_DAQ
- 3 output ROOT file path: /pmtfs/disk01/container_data/rawdata
- 4 file size: about 500Mb for one PMT each test.
- 5 name rule: container+drawer+SN

¹https://juno.ihep.ac.cn/mediawiki/index.php/Onsite_computing/IT

inside one ROOT file

One can get 13 trees and one TObject "Pmtdata" from the ROOT file

```
TFile*      sys1_mass10410_channel123_snPA1901-1069.root
KEY: TTree   mup1pe;1 PA1901-1069_tree0
KEY: TObject Pmtdata auxiliary_info;1
KEY: TTree   mup1pe;1 PA1901-1069_tree1
KEY: TTree   gainm150;1 PA1901-1069_tree2
KEY: TTree   gainm100;1 PA1901-1069_tree3
KEY: TTree   gainm50;1 PA1901-1069_tree4
KEY: TTree   gainm0;1 PA1901-1069_tree5
KEY: TTree   gainp50;1 PA1901-1069_tree6
KEY: TTree   gainp100;1 PA1901-1069_tree7
KEY: TTree   gainp150;1 PA1901-1069_tree8
KEY: TTree   TTSdata;1 PA1901-1069_tree9
KEY: TTree   DCR;1 PA1901-1069_tree10
KEY: TTree   AP;1 PA1901-1069_tree11
KEY: TTree   TTStrig;1 PA1901-1069_tree12
```

TObject:Pmtdata

The custom class "Pmtdta" is inherited from TObject, and it store the auxiliary information of one pmtest such as: SN,test-date,HV,base .etc.

```
41 Pmtdata *thispmt;  
42 f->GetObject("auxiliary_info", thispmt);  
43 TString pmt_id=thispmt->Getsn();  
44 TString test_date=thispmt->Gettestdate();  
45 int uid=thispmt->Getuid();  
46 int fit_HV=thispmt->Getchv();  
47 double cont_dcr=thispmt->Getdcr();  
48 int pmtnum=thispmt->Getpmtnum();  
49 int umassnum=thispmt->Getumassnum();  
50 int base_type=thispmt->Getbasetype();  
51 int pmt_type=thispmt->GetType();  
52 int vendor_HV=thispmt->Getvhv();  
53 double vendor_qe=thispmt->Getvqe();  
54 double vendor_ap=thispmt->Getvap();  
55 double vendor_dcr=thispmt->Getvdcr();  
56 double vendor_rt=thispmt->Getvrt();  
57 double vendor_ft=thispmt->Getvft();  
58 double vendor_pvr=thispmt->Getvpv();  
59 double vendor_res=thispmt->Getvres();
```

waveform data

There are 11 trees for the storage of testing waveform:

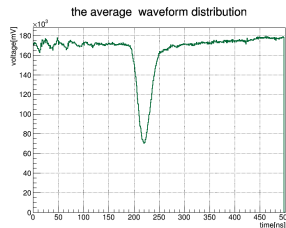
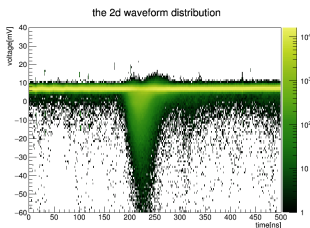
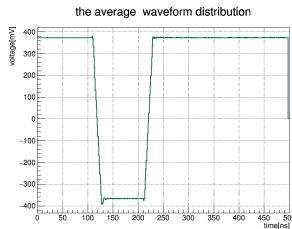
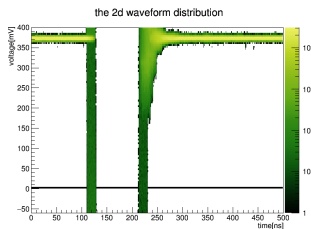
- mu1pe→ with the LED light intensity @ $\mu \simeq 1$.
- mup1pe→ with the LED light intensity @ $\mu \simeq 0.1$.
- gain...→ with the LED light intensity @ $\mu \simeq 0.1$ and HV=vendor HV+{-150V,-100V,-50V,0V,50V,100V,150V}.
- TTSdata→ waveforms for TTS test.
- TTStrig→ waveforms for the trig signals of TTS test.

Each waveform is a "TVector" with length 500, and the value is in mV unit.

Also, the "DCR" tree is for dark count rate data and "AP" tree is for afterpulse data. The values are accumulated DCRs with 1s step.

simple test for the ROOT file

read the TTS and mu1pe waveform from ROOT :



summary

- The waveform raw data and auxiliary testing information can be stored in one ROOT file.
- one can easily access all the raw data for one specific test through ROOT.
- If we convert all testing data, the disk space required is about 15TB.

Back-Up

load the Pmtdata class

to use the shared library:

CINT mode: gSystem-

```
>Load("/home/pmthome/zhaor/zhaorong/cont_v1/pmttest_cc.so");
```

in script:

```
R_LOAD_LIBRARY(/home/pmthome/zhaor/zhaorong/cont_v1/  
pmttest_cc.so);
```