

S-2S meeting (Analysis memo)

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21Jan2014

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WC NPE test

- PMT individual difference
- Reproducibility
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Fitting to NPE histograms

Fitting to a NPE histogram with a Gaussian function

1. Scanned a fitting range to find better chi-square.
(reduced chi-square is closer to 1)
2. Obtained mean value which is used as a result.

Results of WC NPE test

Window + PMT (ID) + Grease

S0 + H11284 (ZK6920) + BaF2: 106.6 ± 0.3 , 105.4 ± 0.6

S0 + H11284 (ZK6900) + BaF2: 106.3 ± 0.5

S0 + H11284 (ZK6917) + BaF2: 100.3 ± 0.6

S0 + H11284 (ZK6920) + BC-630: 106.6 ± 0.8

UV00 + H11284 (ZK6920) + BaF2: 105.8 ± 0.3 , 103.9 ± 0.6

Results of WC NPE test (PMT individual difference)

Window + PMT (ID) + Grease

< 10%

S0 + H11284 (ZK6920) + BaF2: 106.6 ± 0.3 , 105.4 ± 0.6

S0 + H11284 (ZK6900) + BaF2: 106.3 ± 0.5

S0 + H11284 (ZK6917) + BaF2: 100.3 ± 0.6

S0 + H11284 (ZK6920) + BC-630: 106.6 ± 0.8

UV00 + H11284 (ZK6920) + BaF2: 105.8 ± 0.3 , 103.9 ± 0.6

Results of WC NPE test (Reproducibility)

Window + PMT (ID) + Grease

S0 + H11284 (ZK6920) + BaF2: 106.6 ± 0.3 , 105.4 ± 0.6

S0 + H11284 (ZK6900) + BaF2: 106.3 ± 0.5

S0 + H11284 (ZK6917) + BaF2: 100.3 ± 0.6

S0 + H11284 (ZK6920) + BC-630: 106.6 ± 0.8

UV00 + H11284 (ZK6920) + BaF2: 105.8 ± 0.3 , 103.9 ± 0.6

~1%

Results of WC NPE test (UVT acrylic difference: S0 and UV00)

Window + PMT (ID) + Grease

S0 + H11284 (ZK6920) + BaF2: 106.6 ± 0.3 , 105.4 ± 0.6

S0 + H11284 (ZK6900) + BaF2: 106.3 ± 0.5

S0 + H11284 (ZK6917) + BaF2: 100.3 ± 0.6

S0 + H11284 (ZK6920) + BC-630: 106.6 ± 0.8

UV00 + H11284 (ZK6920) + BaF2: 105.8 ± 0.3 , 103.9 ± 0.6

No
difference

Results of WC NPE test (Grease difference: BaF2 and BC-630)

Window + PMT (ID) + Grease

S0 + H11284 (ZK6920) + BaF2: 106.6 ± 0.3 , 105.4 ± 0.6

S0 + H11284 (ZK6900) + BaF2: 106.3 ± 0.5

S0 + H11284 (ZK6917) + BaF2: 100.3 ± 0.6

S0 + H11284 (ZK6920) + BC-630: 106.6 ± 0.8

UV00 + H11284 (ZK6920) + BaF2: 105.8 ± 0.3 , 103.9 ± 0.6

No
difference

Calibration with LED data

Fitting error: $< 1\%$

Backup

Results of WC NPE Fitting with Gaussian function

ROOT_file fit_min fit_max fitting_chi2 NPE NPE_error

```
/*  
// ~~~~~ H11284 (with UVT acrylic) ~~~~~  
../wctest_run473-run475.root 63.5828 125.683 1.51748 106.62 0.327772  
../wctest_run482-run483.root 84.1323 116.332 1.00924 105.379 0.631751  
../wctest_run491-run492.root 63.3351 120.835 1.00049 106.254 0.496533  
../wctest_run499-run500.root 75.2668 112.067 1.07541 100.343 0.576107  
../wctest_run508-run509.root 69.1713 112.871 1.00325 106.602 0.752097  
../wctest_run522-run524.root 71.2943 128.794 1.00654 105.815 0.253288  
../wctest_run531-run532.root 89.5919 119.492 1.12423 103.868 0.56779  
  
// ~~~~~ H6522 (with normal acrylic) ~~~~~  
../wctest_run473-run475.root 28.9385 51.9385 1.05744 37.1751 0.304607  
../wctest_run482-run483.root 23.9927 51.5927 1.02903 37.1833 0.161724  
../wctest_run491-run492.root 28.6007 65.4007 1.15652 41.5879 0.273633  
../wctest_run499-run500.root 31.3393 49.7393 1.11371 39.8408 0.238244  
../wctest_run508-run509.root 26.8336 54.4336 1.32297 40.3137 0.183187  
../wctest_run522-run524.root 19.0641 51.2641 1.14937 41.1156 0.22297  
../wctest_run531-run532.root 18.2231 43.5231 1.89655 37.385 0.235151
```

Toshiyuki Gogami, 20Jan2014
dragonvaio:~/sdb/TOFtest2014/ROOT/window/
*/

LED Calibration

```
#!/bin/sh
```

```
# S0  
# H11284,zk6920, BaF2  
# H6522,la1537, V788  
./mkroot 473  
./mkroot 474  
./mkroot 475  
./mkroot 476 #LED for H11284 (16.87 0.07)  
./mkroot 477 #LED for H6522 (6.68 0.09)
```

```
# S0  
# H11284,zk6920, BaF2 (Detached and attached)  
# H6522,la1537, V788  
./mkroot 482  
./mkroot 483  
./mkroot 484 # LED for H11284 (17.46 0.06)  
./mkroot 485 # LED for H6522 (6.11 0.1)
```

```
# S0  
# H11284,zk6900, BaF2  
# H6522,la1537, V788  
./mkroot 491  
./mkroot 492  
./mkroot 493 # LED for H11284 (10.02 0.06)  
./mkroot 494 # LED for H6522 (5.86 0.06)
```

```
# S0  
# H11284,zk6917, BaF2  
# H6522,la1537, V788  
./mkroot 499  
./mkroot 500  
./mkroot 501 # LED for H11284 (8.23 0.07)  
./mkroot 503 # LED for H6522 (6.07 0.1)
```

```
# S0  
# H11284,zk6920, BC-630  
# H6522,la1537, V788  
./mkroot 508  
./mkroot 509  
./mkroot 510 # LED for H11284 (16.93 0.07)  
./mkroot 512 # LED for H6522 (6.06 0.08)
```

```
# Changed to UV00  
# H11284,zk6920, BaF2  
# H6522,la1537, V788 (detached and attached)  
./mkroot 522  
./mkroot 523  
./mkroot 524  
./mkroot 525 # LED for H11284 (17.50 0.08)  
./mkroot 526 # LED for H6522 (6.11 0.1)
```

```
# UV00  
# H11284,zk6920, BaF2 (detached and attached)  
# H6522,la1537, V788  
./mkroot 531  
./mkroot 532  
./mkroot 533  
./mkroot 534 # LED for H11284 (17.66 0.08)  
./mkroot 535 # LED for H6522 (6.46 0.12)
```