

SK Software training: Scan electron and muon

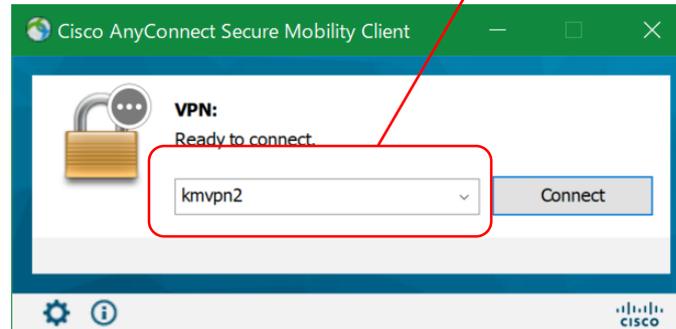
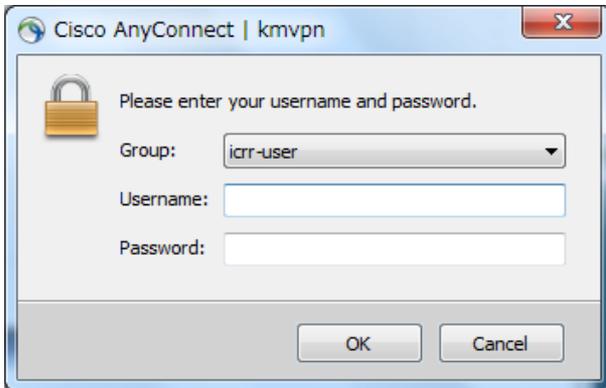
M.Miura

Kamioka observatory, ICRR

1. Start event display

Use kmvpn2 (faster than kmvpn)

(1) Connect VPN.



Login with your account and password in Kamioka computer system (see also Setup.pdf).

(2) Start Xsession (Xming, e.t.c.)

(3) Connect to sukap00

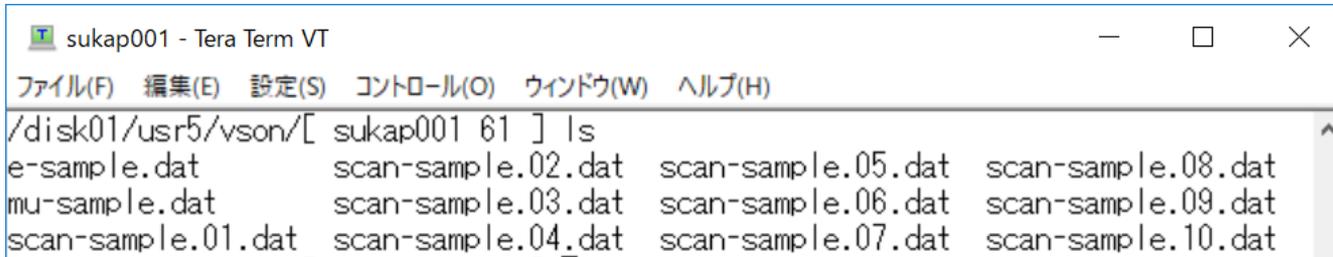
Windows case: Click TeraTerm and login.

Others (Mac, Ubuntu e.t.c.): Open terminal and type
`ssh -X (your-account)@sukap00`

(4) Type ;

ls /disk01/usr5/vson

then you can find event samples.



```
sukap001 - Tera Term VT
ファイル(F) 編集(E) 設定(S) コントロール(O) ウィンドウ(W) ヘルプ(H)
/disk01/usr5/vson/[ sukap001 61 ] ls
e-sample.dat      scan-sample.02.dat  scan-sample.05.dat  scan-sample.08.dat
mu-sample.dat     scan-sample.03.dat  scan-sample.06.dat  scan-sample.09.dat
scan-sample.01.dat scan-sample.04.dat  scan-sample.07.dat  scan-sample.10.dat
```

(5) Type;

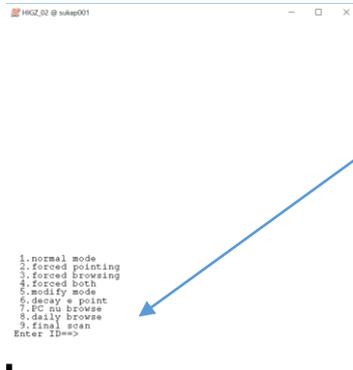
source /usr/local/sklib_gcc8/atmpd_21b/env.csh

(5) Type;

apdraw.csh /disk01/usr5/vson/e-sample.dat

then event display starts.

Command line



```
1.normal mode
2.forced pointing
3.forced browsing
4.forced both
5.modify mode
6.decay e point
7.PC nu browse
8.daily browse
9.final scan
Enter ID=>
```

Type; 1



Type; 36



Type; n

```
1.normal mode
2.forced pointing
3.forced browsing
4.forced both
5.modify mode
6.decay e point
7.PC nu browse
8.daily browse
9.final scan
Enter ID==>
```

```
-1.anonymous
1.kajita
4.masato
7.obayashi
10.moriyama
13.kenkou
16.yamada
19.toshito
22.atstuko
25.habig
28.mcgreg
31.tomba
34.guest1
Enter ID==>
```

```
2.kaneyuki
5.hayato
8.ishihara
11.hatakeyama
14.takuya
17.suzuki
20.nakayama
23.casper
26.kearns
29.messier
32.walter
35.guest2
```

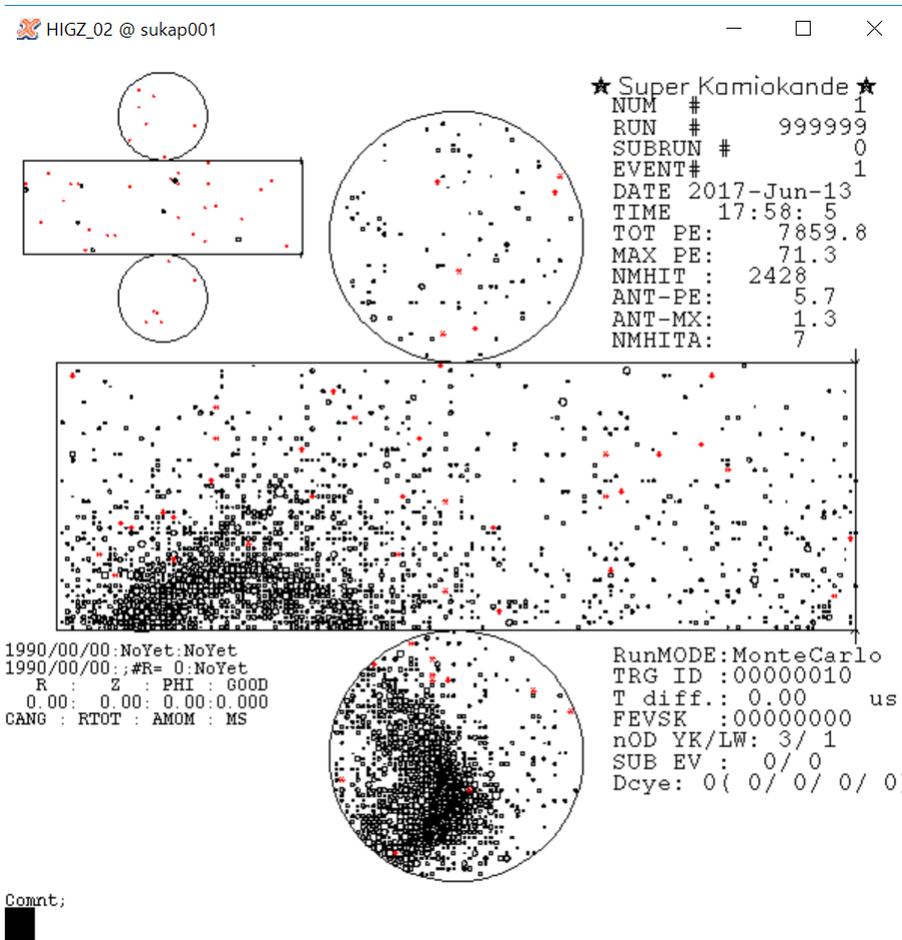
```
3.itow
6.kirisawa
9.miuram
12.eto
15.kameda
18.fujiyasu
21.hideki
24.earl
27.mauger
30.schol
33.mine
36.guest3
```

```
Selecting new mode
Still open output ?
Enter y or n ? [n]
```

If the program crashes in Windows ...

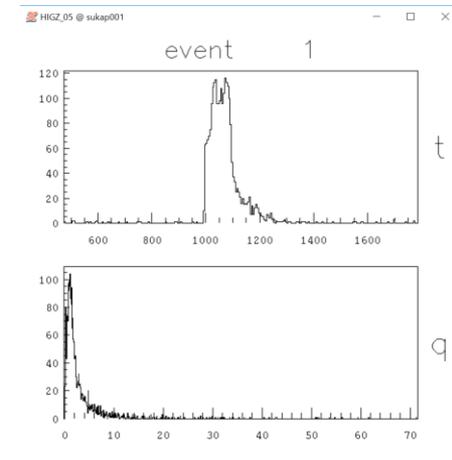
- You may be failed to install Xming and font.
 - Uninstall Xming and font.
 - Restart your PC.
 - Install Xming from <https://sourceforge.net/projects/xming/>
 - Install font from <https://sourceforge.net/projects/xming/files/Xming-fonts/7.7.0.10/>
 - Restart your PC.
 - Then try from page 2 again.

You can see three windows.

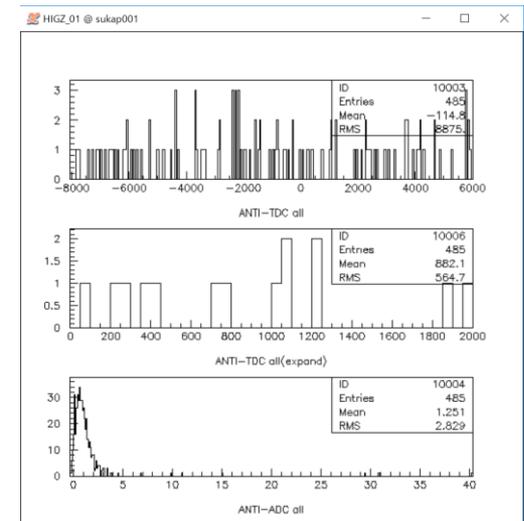


Main display:
Use only this window.

Histograms for inner detector

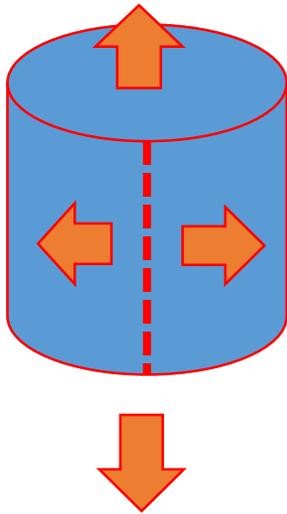


Histograms for outer detector



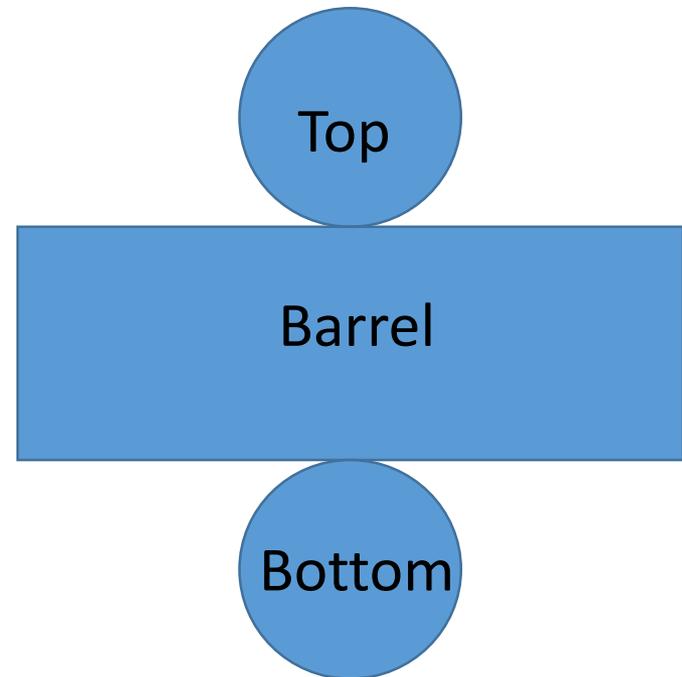
SK event display

SK is cylindrical in 3-D.



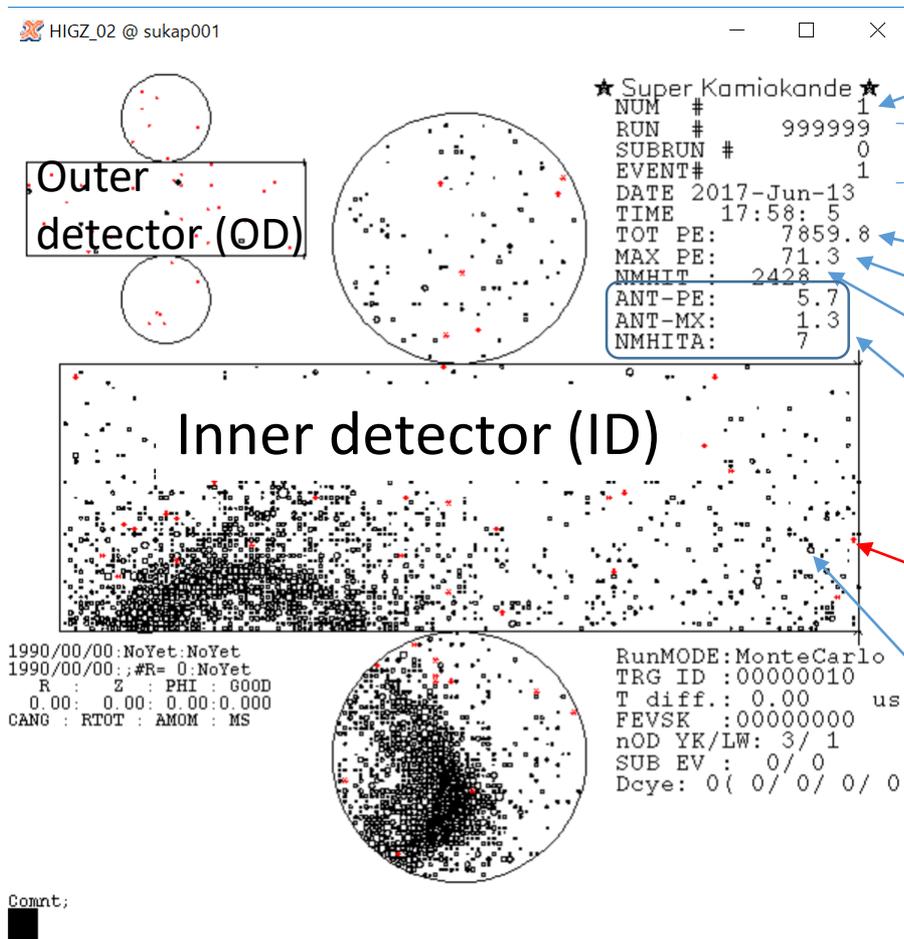
Cut and open.

2-D with 2 circles and rectangle.



2. Explanation about each windows

2-1 Main display



Serial number in this file.

SK run number (999999 for MC), Subrun number (~1 min) and event number.

Total charge in ID (unit: photo electron,pe).

Max charge in ID.

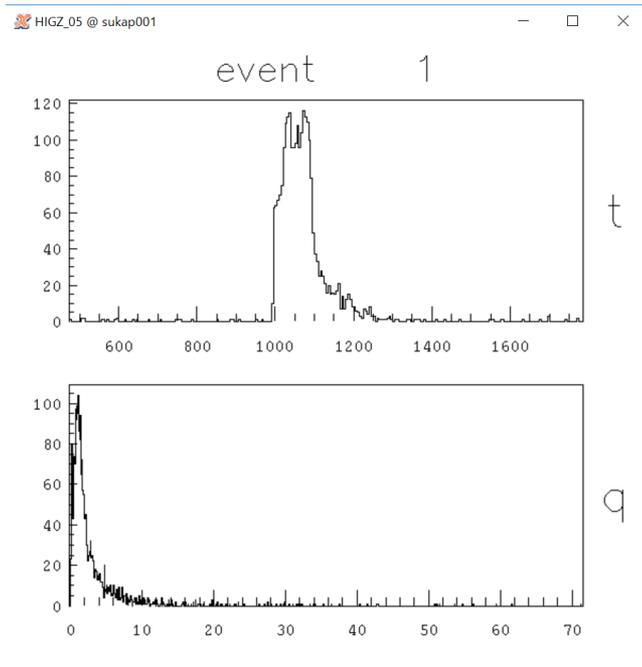
Number of fired PMT.

OD information (not used here).

Red mark shows dead PMT.(~130/11,000 now)

Each circle corresponds to one fired PMT. Circle size corresponds to charge (~ amount of light) detected by the PMT.

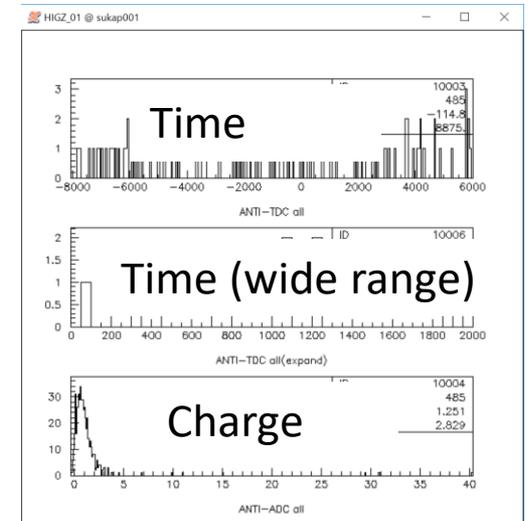
2-2 ID histogram



Time distribution for each PMT (nano second)
Trigger time is adjusted around 1000 nsec.

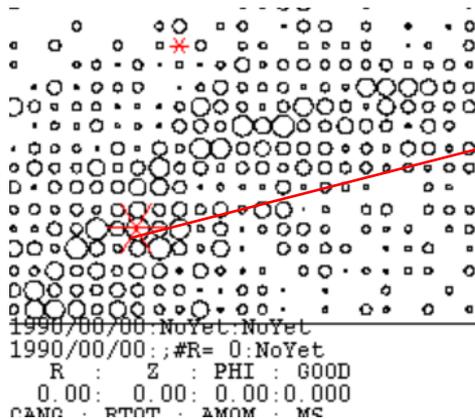
Charge distribution for each PMT (pe).

2-3 OD histogram



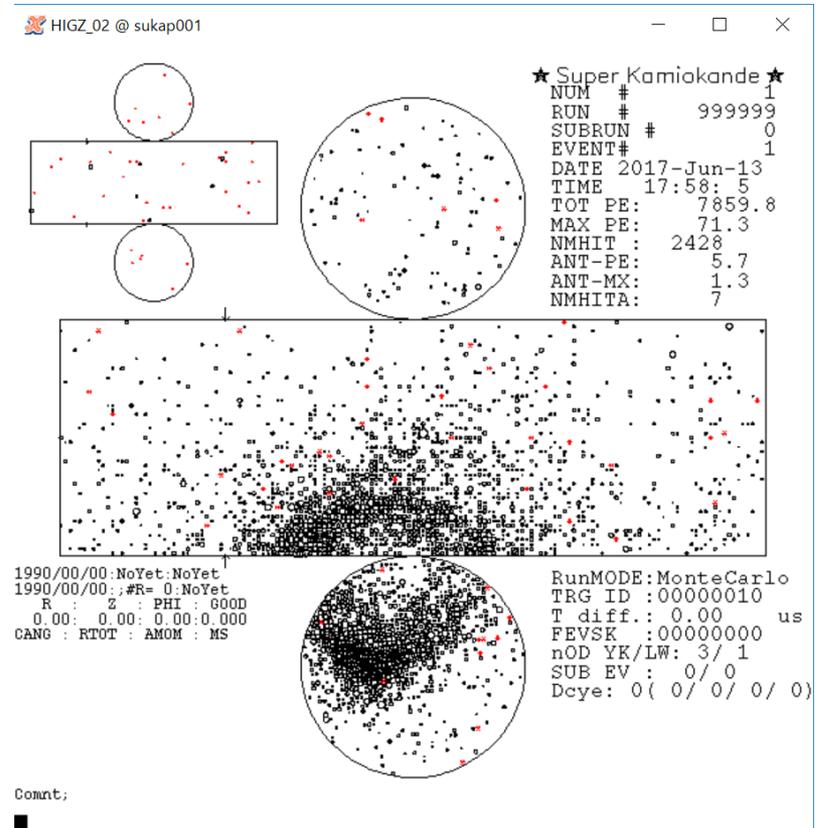
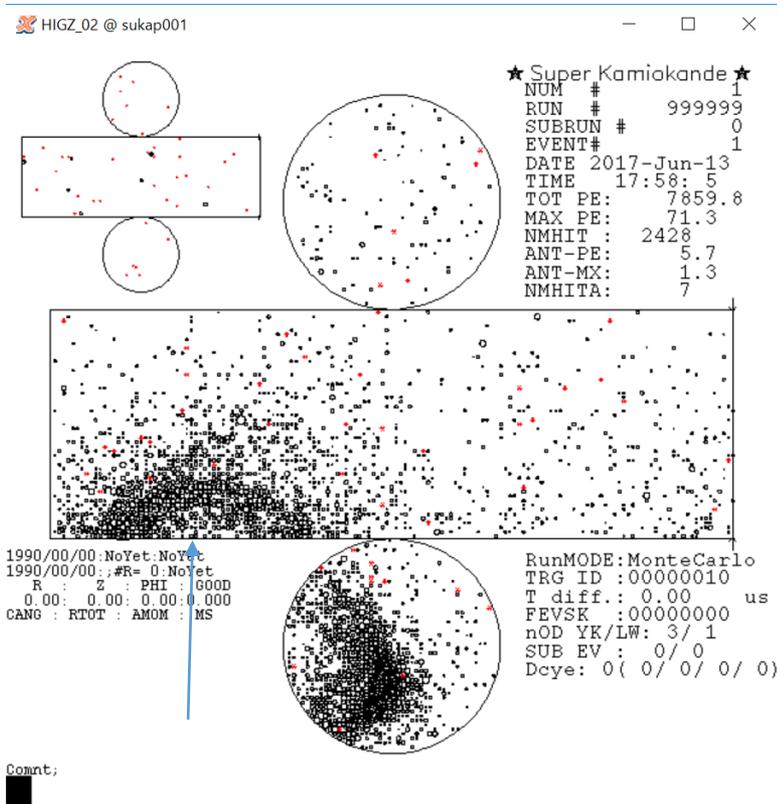
3. Basic command

- quit: End event display.
- n: Move to next event.
- sk "n": Skip "n" events. "sk -1" then go back to the previous event.
- zoom "n": n=1~3, zoom in. Click where you want to zoom. zoom 0 then go back to original size.
- cab: and click PMT (center of circle) then information about the PMT is shown in terminal.



```
IFEVOR=          U  
CMD=(cab)  
Nearest ID cable number : 6635 Status: 0  
sk geometry 4      4  
Hut : 4   TKO : 6   QB slot : 17   QB ch. : 1  
Q : 18.68   T : 1039.
```

- mc: and click then the event display rotates in phi direction so that the clicked point becomes center of the display.



Excise 1

- In /disk01/usr5/vson, you can find event samples.
 - e-sample.dat: electron only.
 - mu-sample.dat: muon only.
 - Random vertex, direction, and momentum.
 - Each sample includes 20 events.
 - **Let's scan e-sample.dat and mu-sample.dat to train your eyes !**

Excise 2

- In the same directory, event samples for each group are prepared.

Group νe → scan-sample.01.dat

Group $\nu\mu$ → scan-sample.02.dat

Group $\nu\tau$ → scan-sample.03.dat

Group $\bar{\nu}e$ → scan-sample.04.dat

Group $\bar{\nu}\mu$ → scan-sample.05.dat

Group $\bar{\nu}\tau$ → scan-sample.06dat

- Each sample includes 20 events.
 - Random vertex, direction, and momentum.
- **Your mission: Identify the event, electron or muon by your eyes.**
- Discuss among group and make final answers of each group.