

Steps to Look at Cosmic Data:

First, open a terminal and login to any Hall A CH machine. Then navigate to: /adaqfs/home/a-onl/sbs/BBCal_replay

Step 1: Replay the cosmic run:

```
[a-onl@aonl2 BBCal_replay]$ source ./setup.sh
setting DATA_DIR etc
[a-onl@aonl2 BBCal_replay]$ cd replay/
[a-onl@aonl2 replay]$ analyzer -l
analyzer [0] .x replay_BBCal.C+(<nrun>,<nevents>)
```

Step 2: Analyze the replayed data:

Again, start from /adaqfs/home/a-onl/sbs/BBCal_replay

For Shower:

```
[a-onl@aonl2 BBCal_replay]$ cd macros
[a-onl@aonl2 macros]$ root -l
root [0] .x Shower_macros/bbsh_cos_cal.C
Run number?
<nrun>
No. of events replayed? [-1 => All]
<nevents>
Want Summary plots? [0=NO, 1=YES]
1
Want trigger amp? [0=NO, 1=YES]
1
Need to change histogram settings? [0=NO, 1=YES]
0
```

For PreShower:

```
[a-onl@aonl2 BBCal_replay]$ cd macros
[a-onl@aonl2 macros]$ root -l
root [0] .x PreShower_macros/bbps_cos_cal.C
Run number?
<nrun>
No. of events replayed? [-1 => All]
<nevents>
Want Summary plots? [0=NO, 1=YES]
1
Want trigger amp? [0=NO, 1=YES]
1
Need to change histogram settings? [0=NO, 1=YES]
0
```

The entries with **red bold** font indicate user input. Here are what they represent:

<nrun> : The run number of the cosmic run one wants to look at.

<nevents> : The number of events to be (or has been) replayed.

Our goal is to see how aligned the signal amplitudes are at the trigger. Hence, we always want to use **1** for third and fourth inputs. The last input should always be **0** for the first try. If the generated plots indicate that the histogram settings are off then rerun the script and this time use **1** for the last input and then put the settings you want.

Additional Useful Information:

- **Dependencies:**
 - These macros read from replayed root files. There is no other dependency.
- **Outputs:**
 - `Output/run_<nrun>_sh(ps)_peak_Trigger.txt`:
Contains peak positions and errors of the distribution of signal amplitudes. We need to read in these values to be able to generate calibrated HV settings.
 - `hist/run_<nrun>_sh(ps)_peak_Trigger.root`:
Contains all the histograms and the summary plots. Becomes very useful when we have a bad fit. One can pull up the histogram, fit it manually and edit the corresponding values in the .txt file we have mentioned above.
 - `plots/SH(PS)_signal_peak_Trigger_<nrun>.pdf`:
All the fitted signal amplitude distributions get saved here.
 - `plots/BBSH(PS)_summary_plots_Trigger_<nrun>.pdf`
Contains all the summary plots.
 - `Output/fit_results/bbshower(preshower)_<nrun>_FitResults_Trigger.txt`:
Contains all the various fit parameters. We seldom use these.