Calibration Process

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Calibration Process

1. Arrange(Dump) the DST files.

2. Draw the energy distribution of the CC04 and CC05 CsI crystals.

3. Fill the histograms of 'DCVPeak' along the track of the cosmic-rays.

4. Fit the histograms and Get the gain factors.

5. Repeat step 3 and 4 for 2 MPPCs and 4 MPPCs.

Configuration of the Working directory

- Working Directory (Some executive files)
  ↳ `/home/had/hmkim/work/hmkim/cal_macro_v2`
  - root

    - period0 (Arranged files of period0)

    - period1 (Arranged files of period1)

    - ...

  - RunList (Run List Text Files)

  - output

    - period0 (Output files from the cosmic-ray tracking and fitting of period0)

    - period1 (Output files from the cosmic-ray tracking and fitting of period1)

    - ...

Arrange(Dump) the DST files

1. Make the RunList text file in the "$WorkDir/RunList" directory.

   1. Form of the file is
      "cosmic_[PeriodID]_[StartRunID]_[EndRunID].txt"

2. Set and Check some parameters at "job_cosmic_arrange.sh"

   1. PeriodID, StartRunID, EndRunID

   2. WorkDir, InputDirPath, OutputDirPath, RunListDir

3. Then, "Run[RunNumber].root" file will be made in "$WorkDir/root/period[PeriodID]" directory.

Draw the Draw the energy distribution of the CC04 and CC05 CsI crystals.

1. hadd Run_[PeriodID]_[StartRun]_[EndRun].root Run*.root

2. ./CC04thre [PeriodID] [StartRunID] [EndRunID] [InputFile] [OutFile]

3. ./CC05thre [PeriodID] [StartRunID] [EndRunID] [InputFile] [OutFile]

4. Check the fitted histogram in the output files.

Fill the histograms of 'DCVPeak' along the track of the cosmic-rays.

Fitting the histogram and Getting the gain factors.

1. ./langaus [PeriodID] [StartRunID] [EndRunID] [InputFile] [OutputFile]

    1. InputFile is the output file from the cosmic-ray traking histogram.

    2. OutputFile contains the gain factors, gain factor errors, Chi2/ NDF, PeriodID, StartRunID, EndRunID, Fitted histograms.

Batch Job Code(Cosmic arranging)

```
export PeriodID=0
export StartRunID=30776
export EndRunID=30787

export WorkDir=/home/had/hmkim/work/hmkim/cal_macro_v2
export InputDirPath=/gpfs/fs03/had/koto/ps3/klea/production/run81/pro0/work/fiber_out/dst_data
export OutputDirPath=${WorkDir}/root/period${PeriodID}
export RunListDir=${WorkDir}/RunList

echo "PeriodID = $PeriodID"
echo "StartRunID = $StartRunID"
echo "EndRunID = $EndRunID"
echo "WorkDir = $WorkDir"
echo "InputDirPath = $InputDirPath"
echo "OutputDirPath = $OutputDirPath"
echo "RunListDir = $RunListDir"

while read A
do
bsub -q l -o ${WorkDir}/log/log$A "./cosmic_arrange $A ${InputDirPath} ${OutputDirPath}"
done< $RunListDir/cosmic_${PeriodID}_${StartRunID}_${EndRunID}.txt

        # If you want to batch the single job in your current server,
        # Delete the comment out flag at underline and Input the RunID.
        # You also have to set the upper bjob lines to comment out.

#./cosmic_arrange RunID ${InputDirPath} ${OutputDirPath}


        # If you want to batch the single job in subsystem server,

# B = RunID
# bsub -q l -o log$B "./cosmic_arrange $B ${InputDirPath} ${OutputDirPath}"
```

Batch Job Code(Energy Calibration)

```bash
export PeriodID=0
export StartRunID=30776
export EndRunID=30787

export WorkDir=/home/had/hmkim/work/hmkim/cal_macro_v2

# Sum
hadd ${WorkDir}/root/period${PeriodID}/Run_${PeriodID}_${StartRunID}_${EndRunID}.root ${WorkDir}/root/period${PeriodID}/Run*.root

# Setting the CC04 and CC05 theshold.
./CC04thre ${PeriodID} ${StartRunID} ${EndRunID} ${WorkDir}/root/period${PeriodID}/Run_${PeriodID}_${StartRunID}_${EndRunID}.root ${WorkDir}/output/period${PeriodID}/CC04thre_${PeriodID}_${StartRunID}_${EndRunID}.root

./CC05thre ${PeriodID} ${StartRunID} ${EndRunID} ${WorkDir}/root/period${PeriodID}/Run_${PeriodID}_${StartRunID}_${EndRunID}.root ${WorkDir}/output/period${PeriodID}/CC05thre_${PeriodID}_${StartRunID}_${EndRunID}.root

# Fill the histograms.

# Landau-Gaussian Fitting for each MPPC.
./langaus_gain ${PeriodID} ${StartRunID} ${EndRunID} ${WorkDir}/output/period${PeriodID}/dcv_output_0.root ${WorkDir}/output/period${PeriodID}/FitOut_0.root
```