The Status of the Offline Calibration for Run13500-13827

Z. P. Mao B. S. Cheng J. F. Qiu X. P. Huang
Y. Yuan L. F. Sun G. P. Chen P.Q. Li R. Rong Jing Liu
Institute of High Energy Physics, Academia Sinica, P.O. Box 918, Beijing 100039, China

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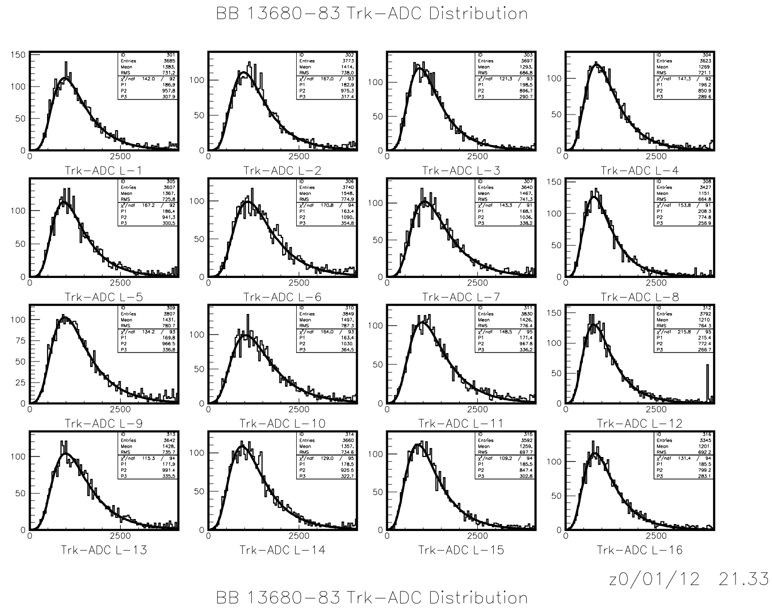
(Summary of the Works of Cal. Group)

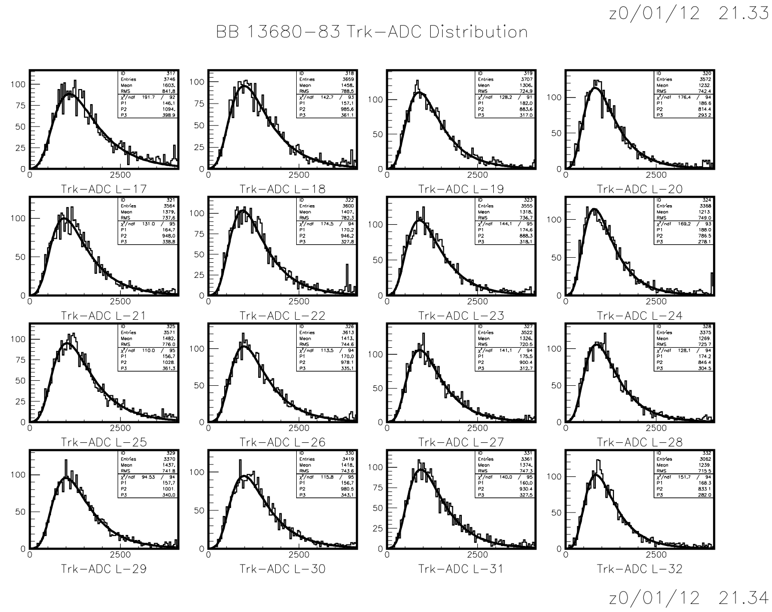
- **The Data Quality Study and the Prepare of Cal.**
- **The Status of the Data Offline Calib. and the Preliminary Results**
- **The Conclusion and the Problem**

1 The Data Quality Study and the Prepare of Cal.

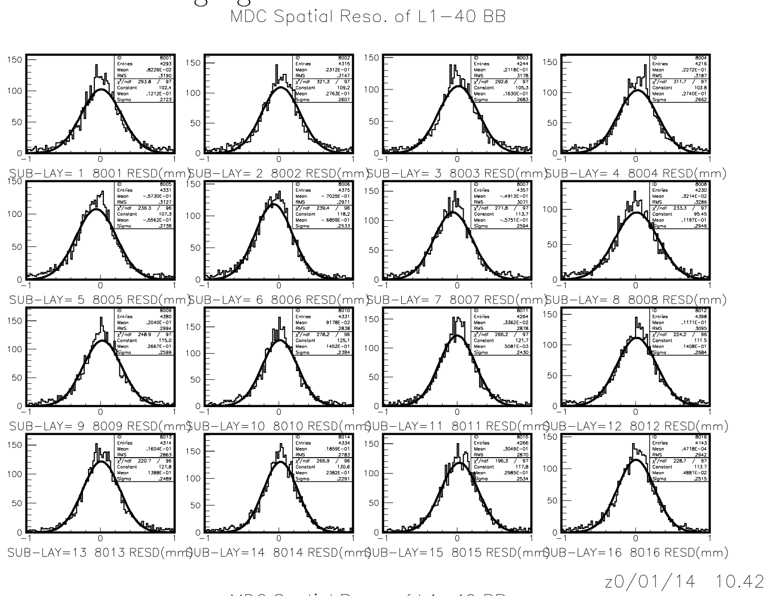
At beginning of the data taking, first thing is checking the data quality with hardware and online data taken system, and codes checking to prepare the calibration and data reconstruction. The main jobs that we did in this period is as following:

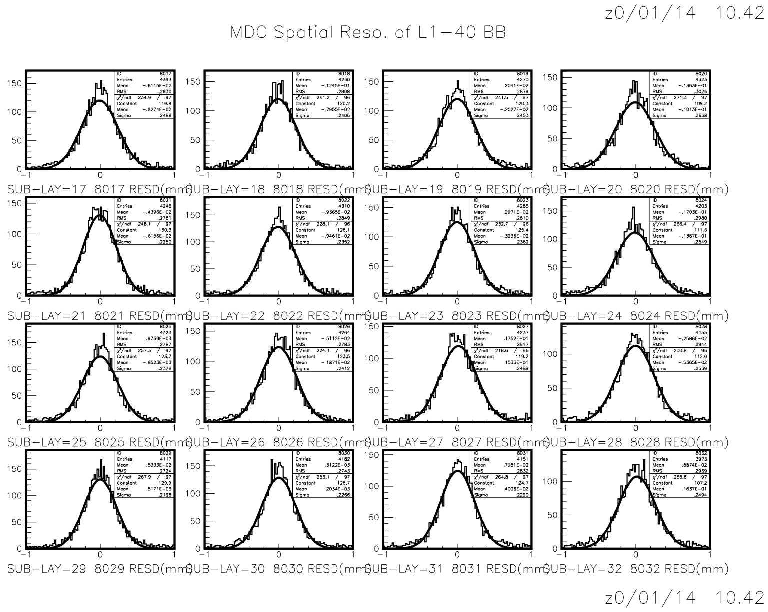
- The study of the pulse height(ADC) of MDC: the purpose of this job is to provide the criteria for MDC to increasing the high voltage of the field wire. Because we found the efficiency of the MDC wire is little lower, and there is a little dips in the con(ϕ) distribution of the hadranic events in last year. The following Figures show the ADC distribution of 40 layers of MDC after adjustment.





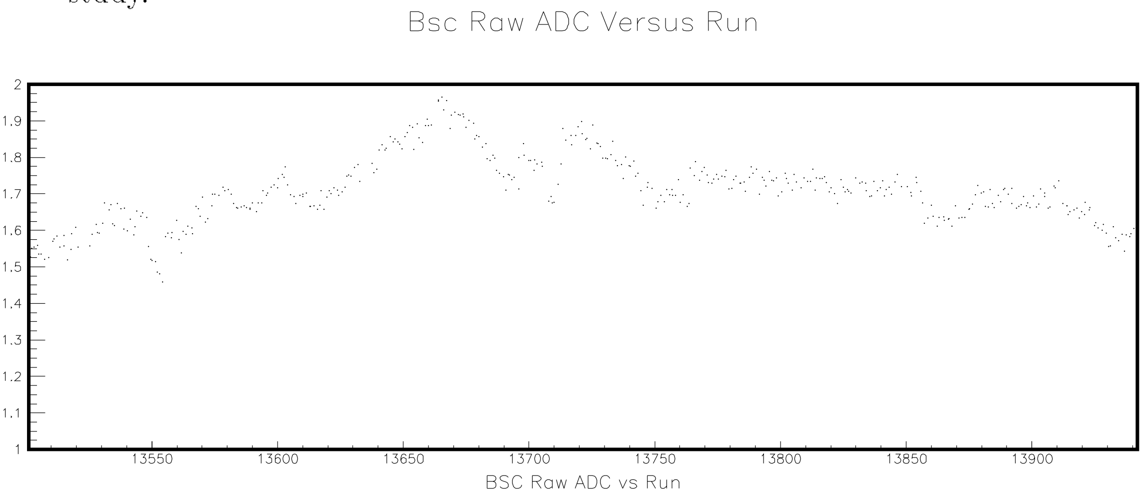
- The checking of the error matrix of the charged tracks: The $1/\sigma_{xy}^2$ (σ_{xy}: MDC spatial resolution) is considerated as the tracking fit-weight used in the MDC tracking, and it will effect the error matrix of the charged tracks. Due to the telesis codes will use it, we get the spatial resolution of each layers by a special way as shown Following figures.



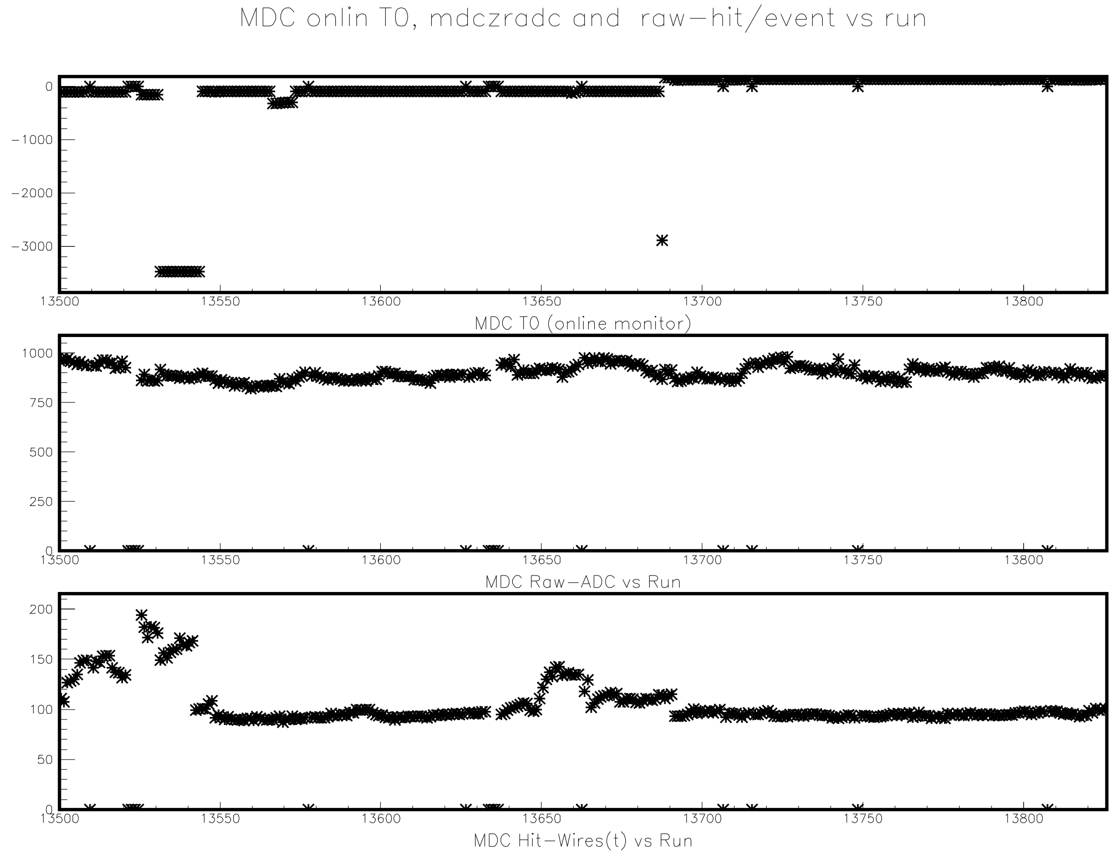


- The study the "online calibration" for VC, this is done with DPG group, final we found the that calibration is not good for spatial resolution of the VC, so we give up this testing.

- The changes of the Raw ADC of the BSC: We selected the bhabha events by the MDC information only and get The RAW BSC ADC of the events run by run, this is very useful for study the changes of BSC working-condition and calibration study.



- The checking of MDC online T0, Raw ADC and TDC-hit-map: Because the MDC T0 is very sensitive for the MDC momentum resolution, The MDC TDC hitting numbers of event shows the noise level of the data quality, we checked them run by run as following figures:



- The checking of the calibration codes in V102: We checked the V102 codes to plan to Cal. and Rec. j/ψ data using the BES V102, and this will be done continue.

- The MDC-VC track matching study: We plane to Rec. the j/ψ data by the MDC-VC track matching method. But we found some problem when do the Cal. by MDC-VC track matching method, due to no enough time to study it now, we will still use MDC tracking same as v101. The MDC-VC track matching will be study continue later.

2 The off-line data calibration for Run13500-13827

2.1 The Status of the off-line data calibration

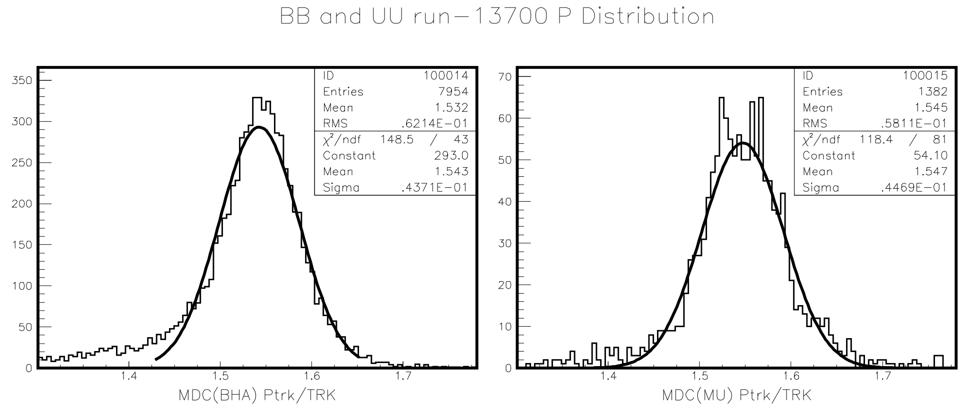
Table 1. The BESII Data Off-line Calibration Status

Name of Det.	Run No.	Cal. Status
MDC T_0 MDC T_0	13500–13579 13591–13800	ok ok
MDC-Hot	13500–13800	ok
MDC Survey		ok
MDC dE/dx	system cal.	ok
MDC dE/dx	13500–13799	run by run
BSC	13500–13888	per 20 run
ESC	13500–13888	per 20 run
TOFB	13500–13820	per 20 run
TOFE	13500–13820	study
VC	13500–13800	ok
VC Survey		ok
μ ID		study

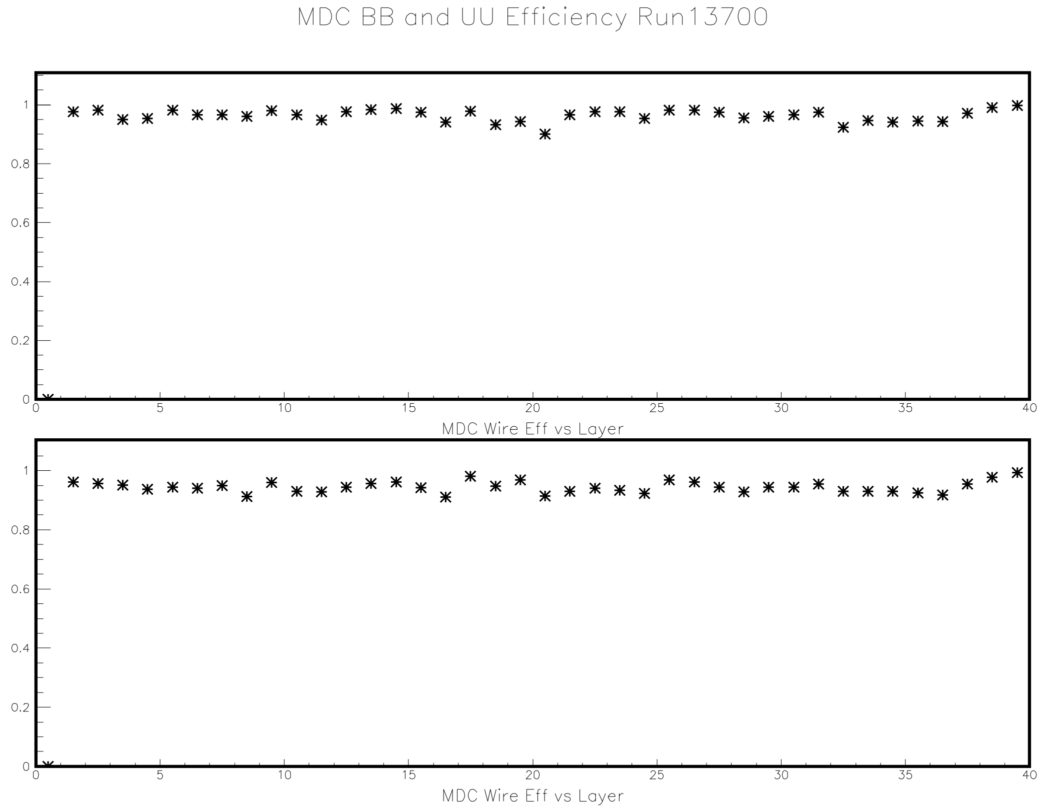
2.2 The preliminary Cal. results of run13500-13800

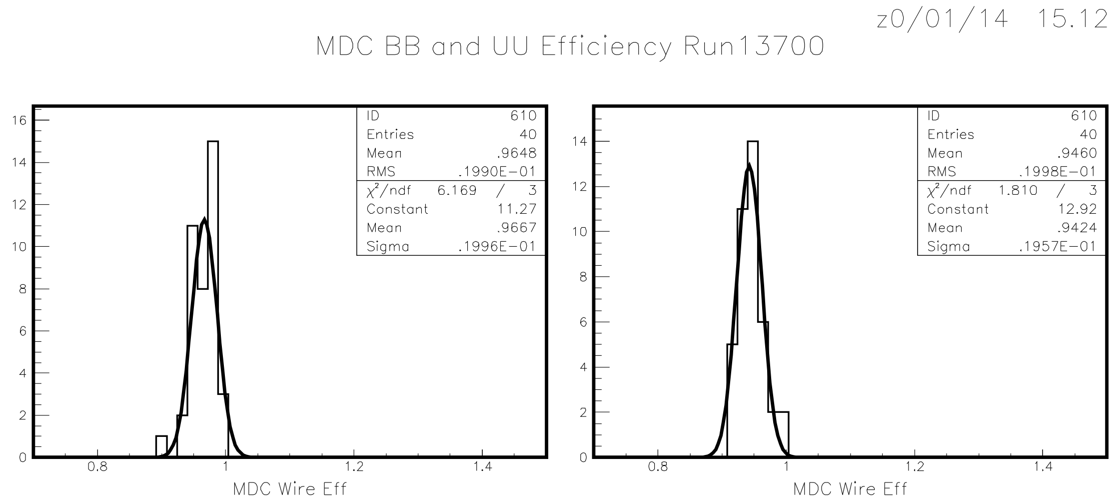
2.2.1 The MDC cal. typical plots

The momentum distribution from Bhabha and diomu events is shown as following, the δP is about 44 MeV.

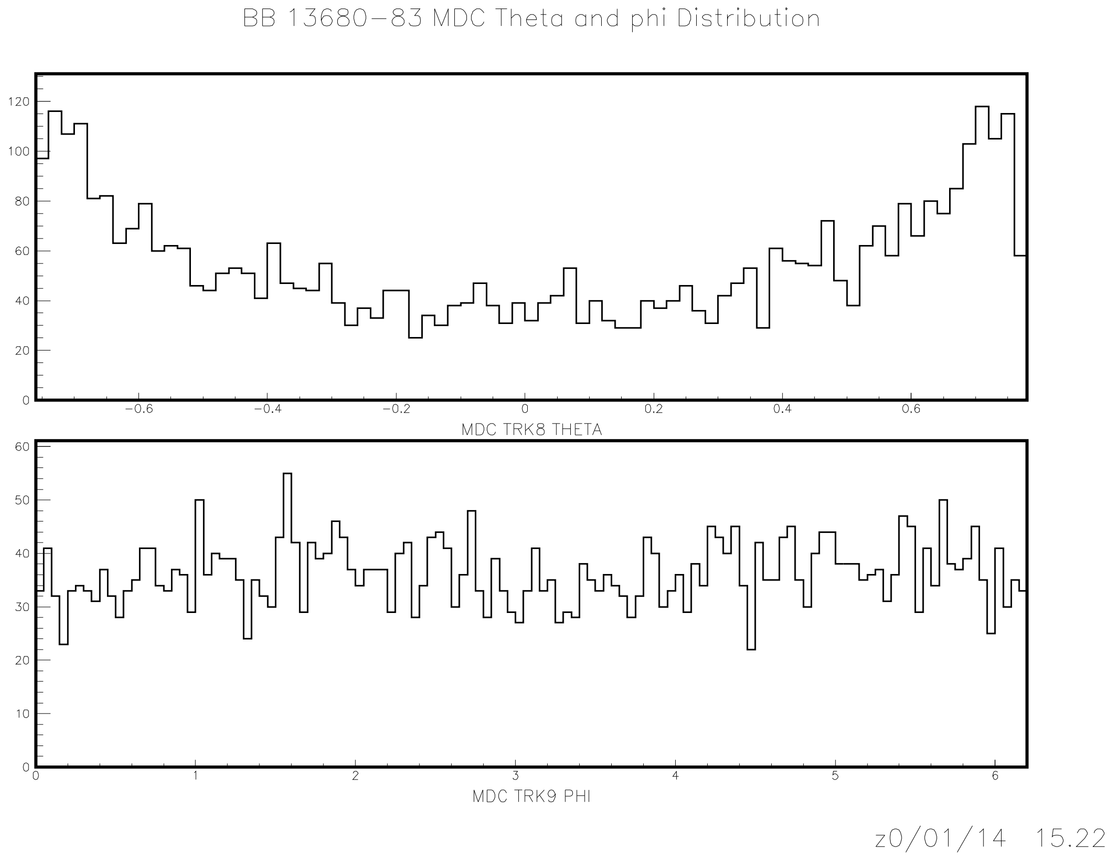


The wire efficiency of MDC got from the Bhabha and diomu events are shown as following figures, the average efficiency is about 96.6% and 94.2% for Bhabha and diomu events respectively.

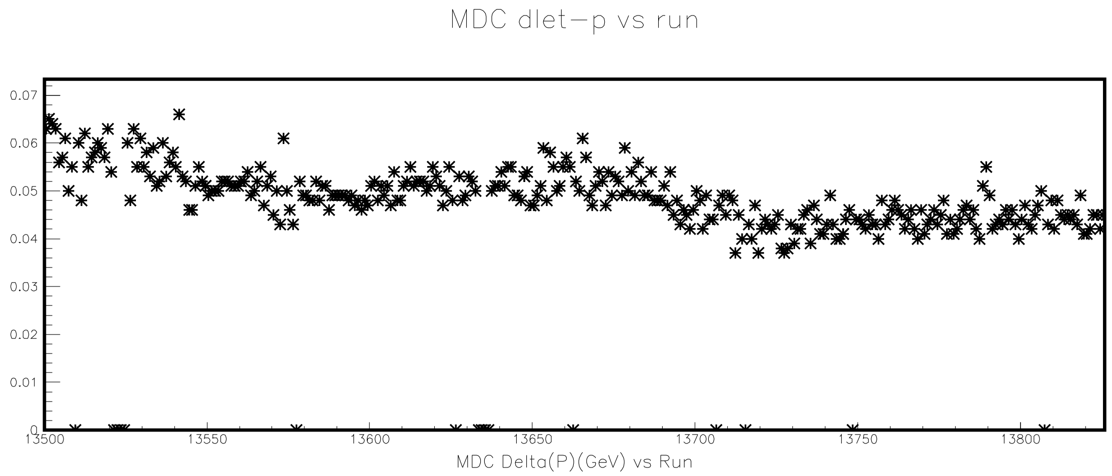




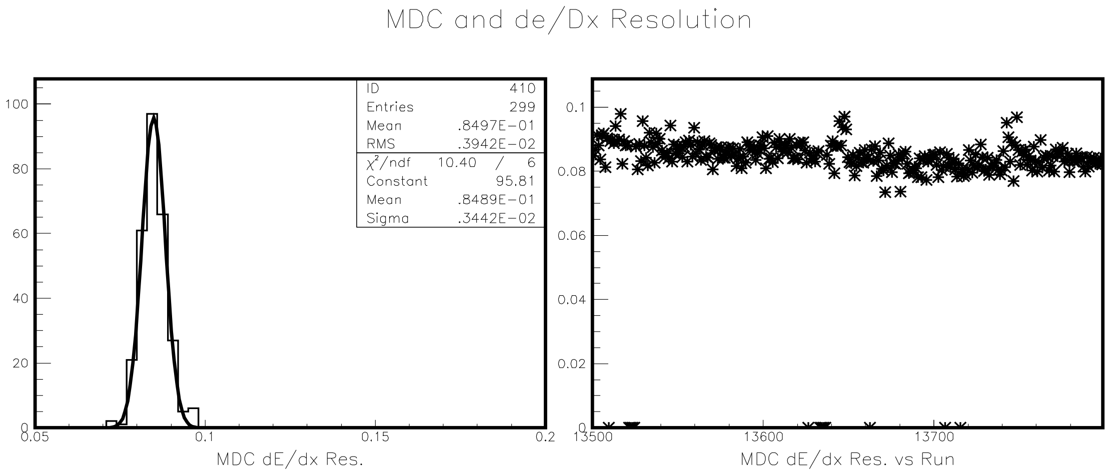
The θ and ϕ distribution of the MDC tracks from BhaBha events is shown as following:



The momentum resolution of the MDC versus the run is shown as following, it shows the MDC works stable and the P-resolution is better than BESI.

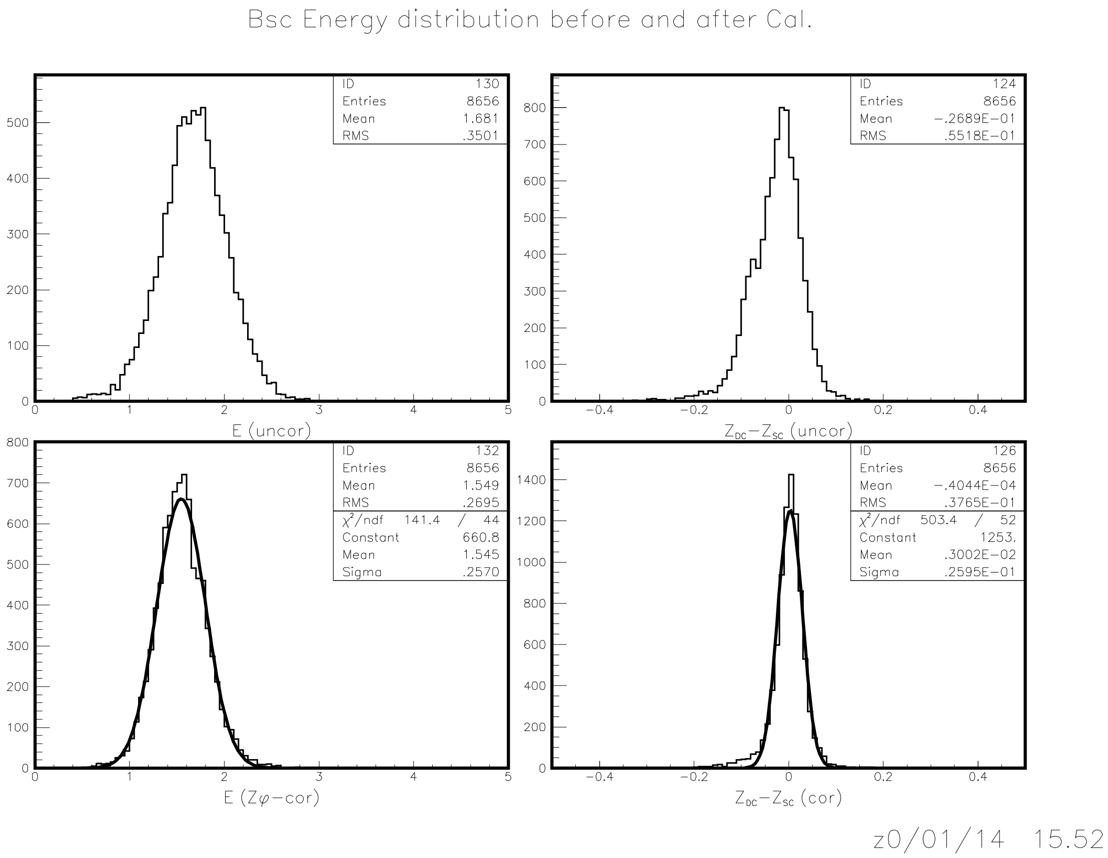


The MDC de/Dx resolution run by run is shown as following, the average de/Dx resolution is about 8.48%

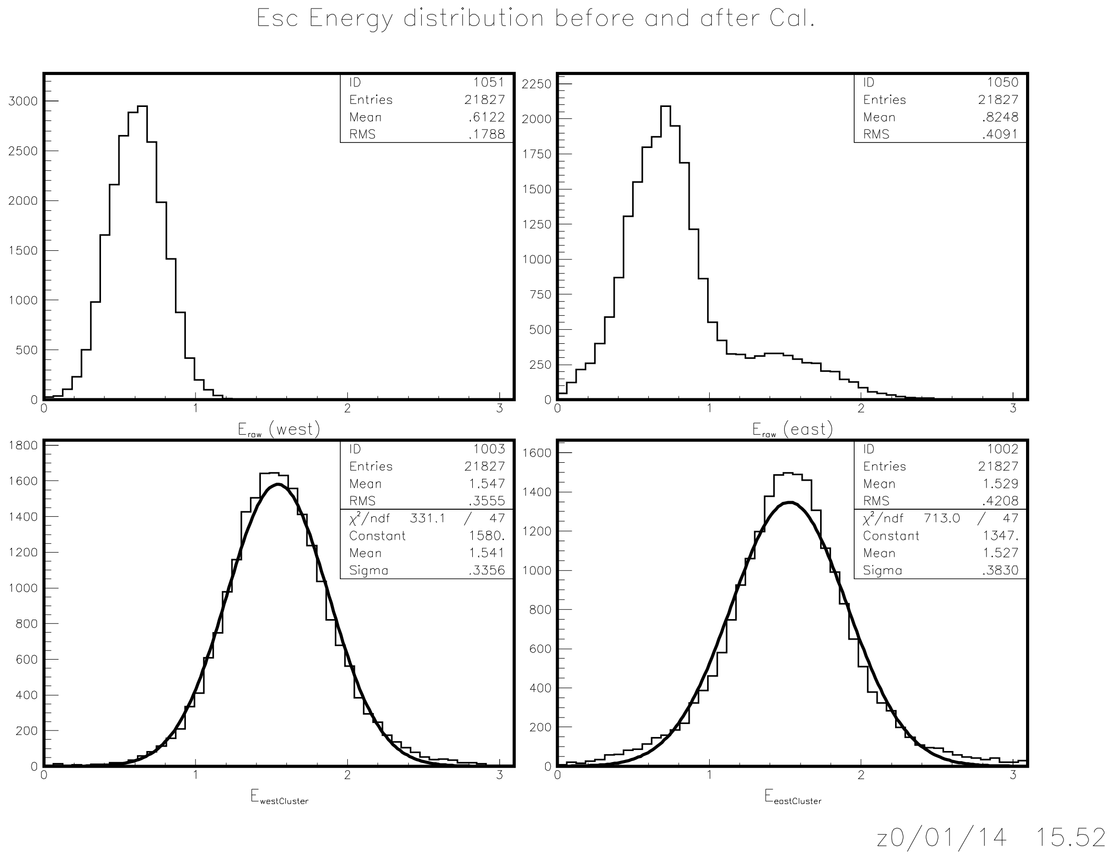


2.2.2 The BSC and ESC Cal. typical plots

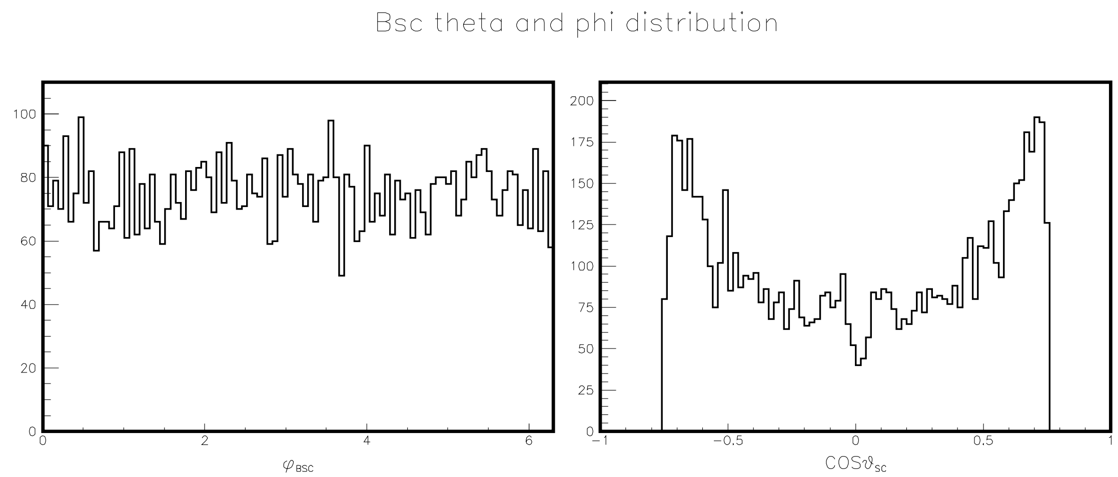
The energy and the z-position distribution of BSC before and after calibration are shown as following, the z resolution is about 2.6 cm, the energy resolution is about 21%.



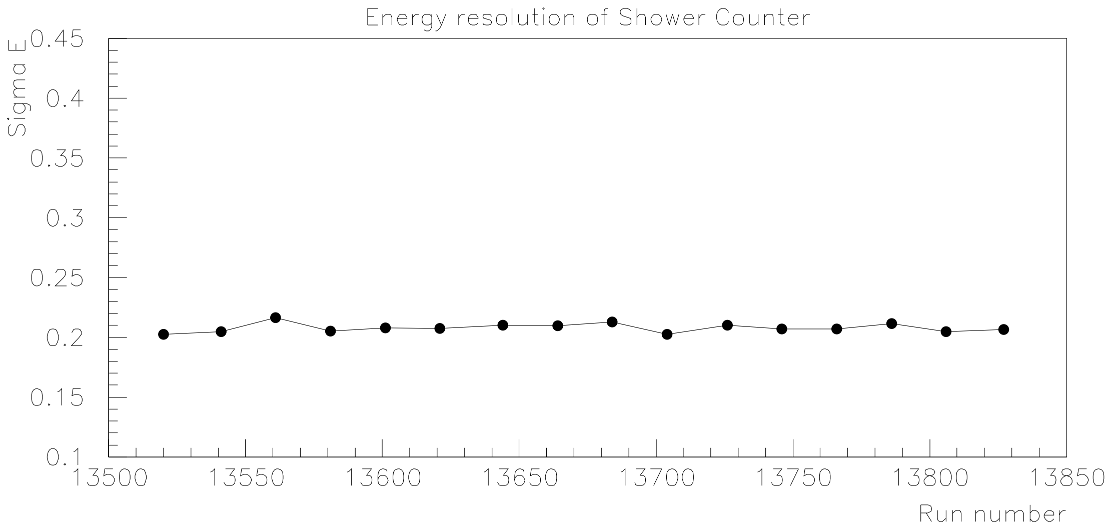
The energy distribution of east and west end of ESC before and after calibration are shown as following, the energy resolution is about 25% in west end, and 33% for east end, (due to the amplitude is too small at some channels, this problem is solved by the hardware group now).

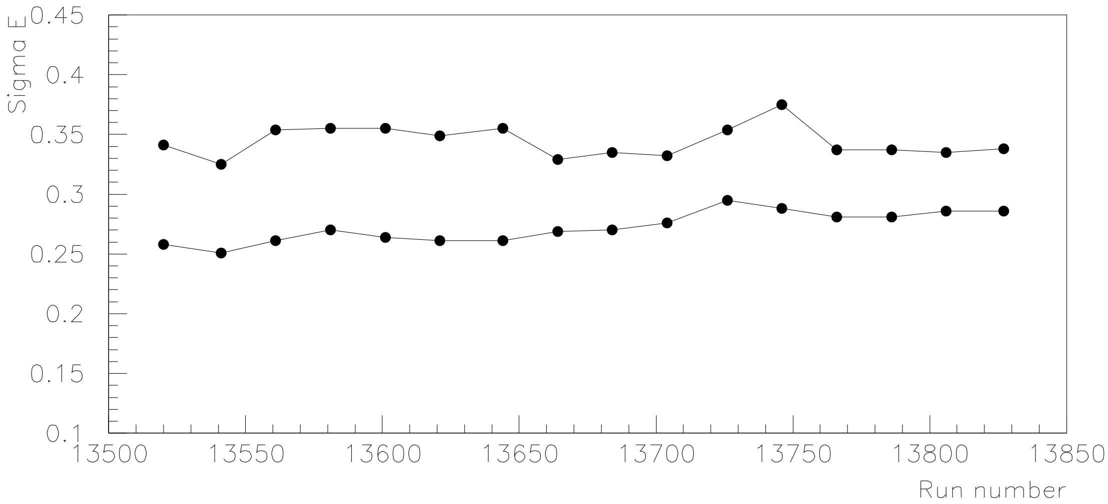


The θ and ϕ distribution of the BSC clusters from Bhabha events were shown as following:



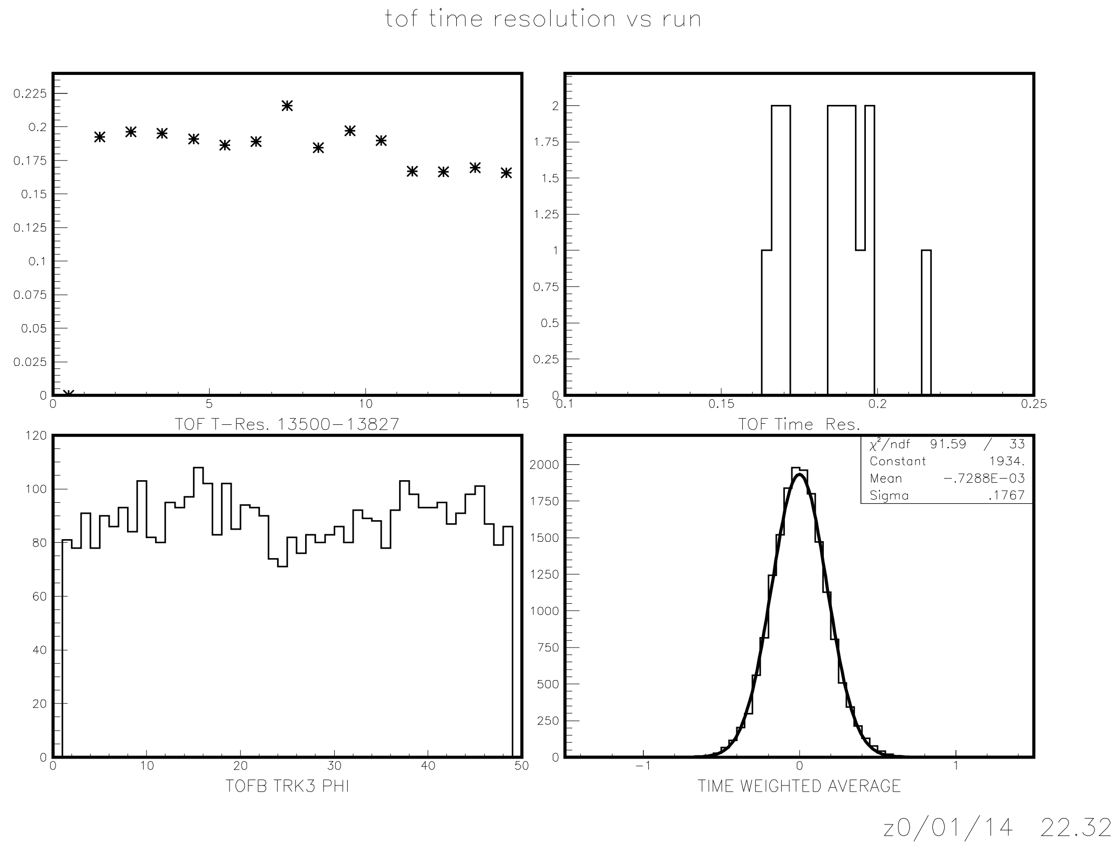
The energy resolution of the BSC and ESC versus the run(per 20 run) is shown as following:





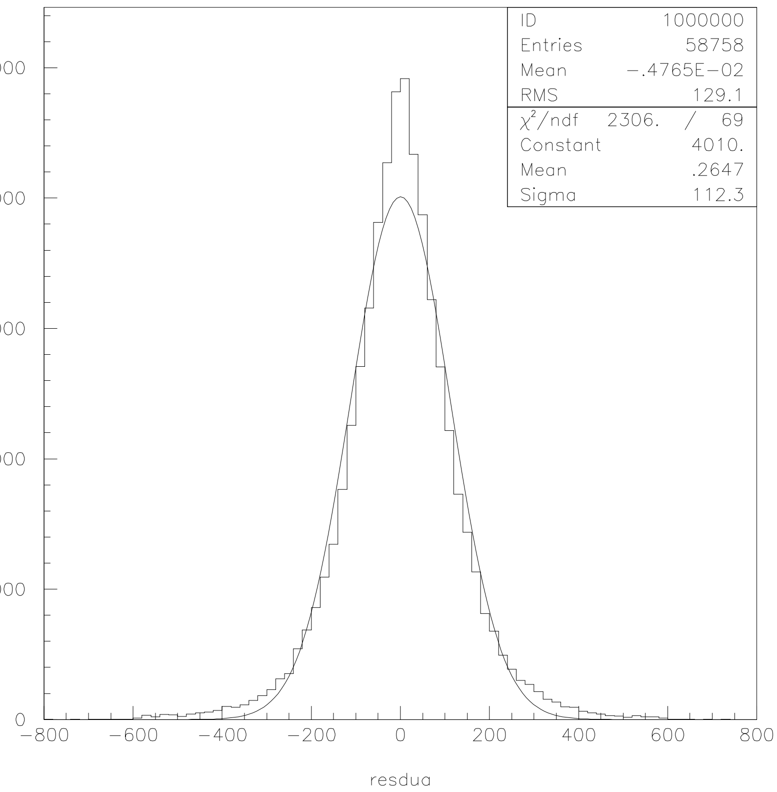
2.2.3 TOF Cal. typical plots

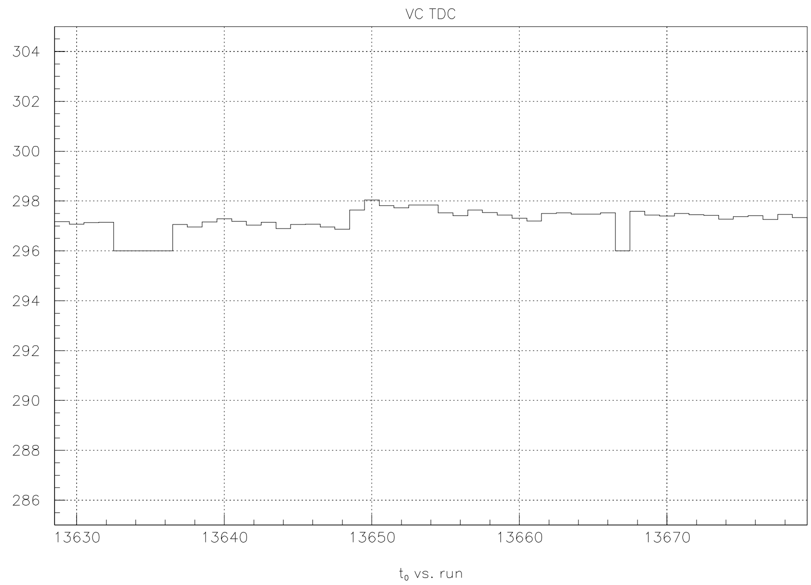
The TOF time resolution around run(per 20 run) and the δ time distribution is shown as following, the average time resolution is about 185 ps.



2.2.4 The VC Cal. typical plots

The spatial resolution of the VC is about 112 μm as shown as following figures. The changes of VC T0 is shown as the following figure, because one TDC channel is 2 ns, it is very sensitive for the momentum and spatial resolution of the VC.





3 The Conclusion and Works in Next Step.

3.1 The Summary of the Detector Performance

Table 1. The Preliminary Detector Performance for Run13500-13800

Parameters	Performance
MDC-Time:	
W-EFF	$\simeq$ **96.6** %.
W-σ_{xy}	$\simeq$ **190-200** μ**m**
Mom-Reso.	$\delta p/p \simeq 1.69\%\sqrt{(1+p^2)}$
MDC dE/dx:	
σ_{tru} **BB-event**	$\simeq$ **8.48** %.
BTOF:	
σ_T **mean**	$\simeq$ **185 ps.**
Atten. Leng.	$\simeq$ **3. m**
BSC:	
ERG-Reso.	$\delta E/\sqrt{E} \simeq 20.58\%$.
Err-Z-Posit.	$\simeq$ **2.6 cm**
ESC:	
ERG-Reso.	$\delta E/\sqrt{E} \simeq 25.5\%$.
Vert. Chamber:	
W-σ_{xy}	$\simeq$ **112** μ**m**
W-EFF	$\simeq 93.2 - -94.4\%$

3.2 The Problem and Works in Next Step.

We will do following works as soon as possible to begain the data reconstruction soon.

- **The v102 code checking for Data Rec.**
- **The MDC-VC tracking match**
- **the MDC-error matrix adjstment continue**