The Status of the BES Reconstruction System-V101 in LINUX System

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1 The Introduction

In order to push the application of the PC-LINUX system on the BES offline data analysis system, Zhang Lie and other peoples did lots of contribution on this field, begin to study the BES-V88 since 1997, then created PC-LINUX-V100 in last year. The BES PC-LINUX-V101 was created on the the beslx01(PC-II350) which is emigrated from HP BES V101.

If the BES-LINUX system will be used for the BES offline data analysis, we should make the checking widely and exactly between this two system. The main jobs in this field will been pay attention to the:

- BES-MC SYSTEM (SOBER, SIMBES)
- DATA OFFLINE ANALYSIS SYSTEM(Data Filter, Calibration and Reconstruction)
- PHYSICS ANALYSIS SYSTEM

In this note, we just describe the status of the data reconstruction codes for real-data, MC data and roughly checking the kinematic fit codes.

2 The Method of LINUX System Checking for BES V101

2.1 the Checking Criteria

At first, reconstruction the data sample in the HP and PC, all of the parameters of subtypes mentioned above have been filled into ntuple and out put a ASKII file same time. The BES software version V101 and the data sample of run12054.flt is used for this job.

After finished above job, the comparison of each parameters of the subtypes is done using the two kinds of ASCII files(from HP and PC), The δ value between the HP and PC of the parameters is defined as:

(Ipar_vhp - Ipar_vPC)/Ipar_vhp

The 0.01 is taken as the different criteria in this note. That is: if the δ of a given parameter of a subtype is great than 0.01, then this parameter of the subtype is considered as different between HP and PC.

2.2 The BES Track-list and the Items Checked at First Step

	No. of Par.	checking items
subtype 1	15	**Track Identification Block**
subtype 2	0	**Free**
subtype 3	35	**MDC One-Track Fit**
subtype 4	34	**TOF Counter Items**
subtype 5	29	**BSC and ESC track Items**
subtype 6	5	**Muon Chamber Items**
subtype 7	18	**dE/dX Items**
subtype 8	0	**Vertex Constrained Track Fit**
subtype 9	0	**MDC Raw data Pointers**
subtype 10	0	**SC Raw data Pointers**
subtype 11	38	**Projected Coordinates of MDC Trk**
subtype 12	0	**Reconstructed (virtual) Track**
subtype 13	35	**VC One-Track Fit**
subtype 14	0	**VC Raw data Pointers**
subtype 15	38	**Projected Coordinates of VC Trk**
Subtype 16	0	**MDC-VC matching Items**
Total par.	247	

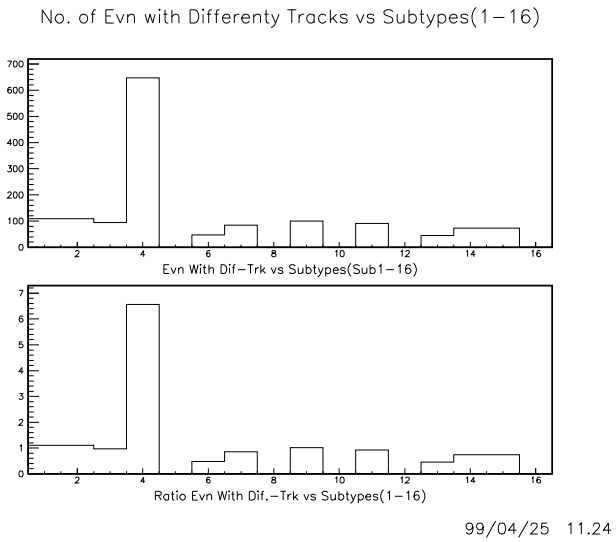
3 The Comparison of BES Reconstruction System of the HP and LINUX(V101) for Real-Data

The differences of the results of the reconstruction got from the HP and PC is quite explicitly . There are two kinds of results:

- First one is: If the track number of a subtype in a event got from two machin is different, this subtype be called TRK DIF.
- The second one is: The events with same tracks No., if the value of Ith parameter of the subtype got from two machin is different, this parameter is called the PAR DIF.

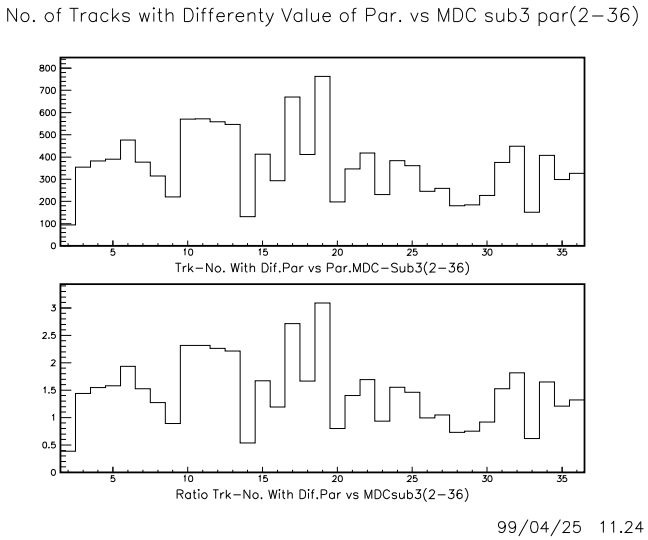
3.1 The Comparison of the track No. for the each subtype

The TRK DIF is shown in the Fig. 1, the first plot is the absolute events number with different track number virus the subtypes, the second plot is the percentage ratio of the events with different track number virus subtypes. From this plot, we can see the maximum differences is about 7% on the subtype 4(TOF). The differences of most subtype is around 1%.



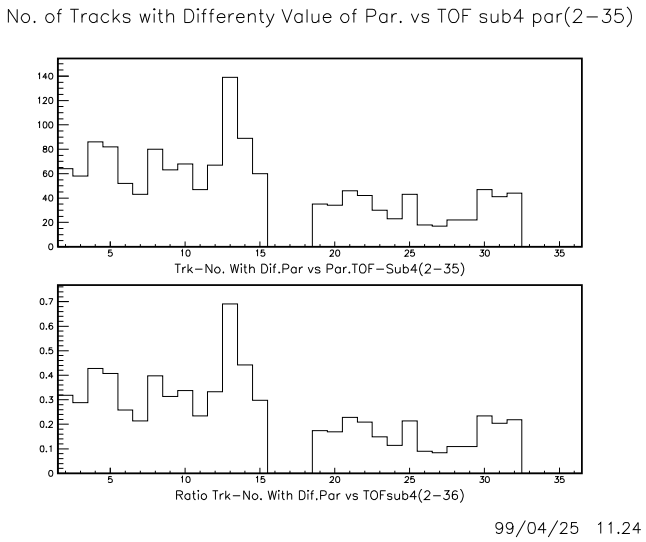
3.2 The Comparison of the Parameters for the subtype 3

The PAR DIF of subtype 3 is shown in the Fig. 2, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 3. The second plot is the percentage ratio of the PAR DIF track numbers virus the parameters of the subtype 3. From this plot, we can see the maximum differences is 3% in the parameter 19(mfit). The difference of most parameter is around 1.5%.



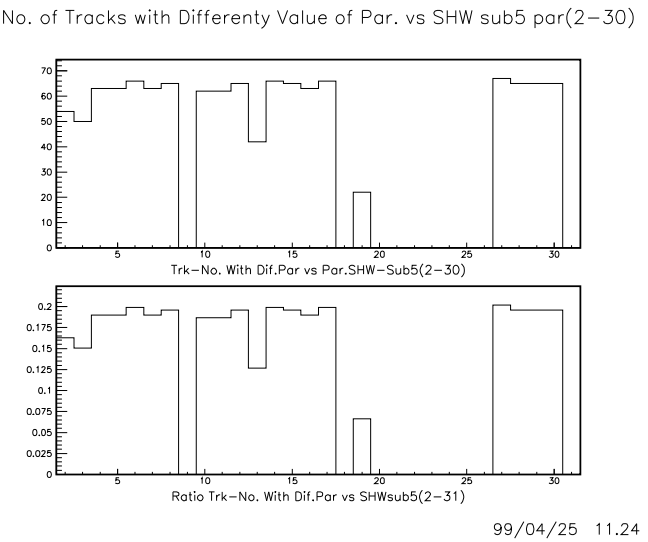
3.3 The Comparison of the Parameters for the subtype 4

The PAR DIF of subtype 4 is shown in the Fig. 3, the first plot is the absolute PAR DIF track numbers virus each parameter of the subtype 4. The second plot is the percentage ratio of PAR DIF track numbers value virus the parameters of the subtype 4. From this plot, we can see the maximum difference is 0.7% in the parameter 13(mass2). The difference of most parameter is around 0.3%.



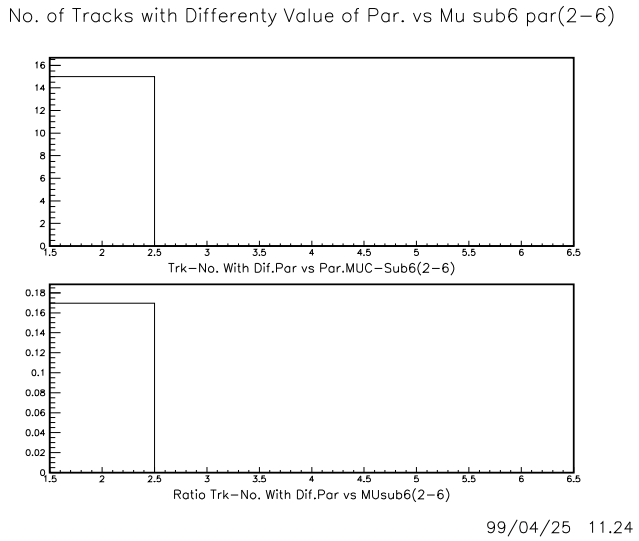
3.4 The Comparison of the Parameters for the subtype 5

The PAR DIF of subtype 5(SHW) is shown in the Fig. 4, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 5. The second plot is the percentage ratio of the PAR DIF track numbers virus the each parameter of the subtype 5. From this plot, we can see the the difference of most parameter is less than 0.2%.



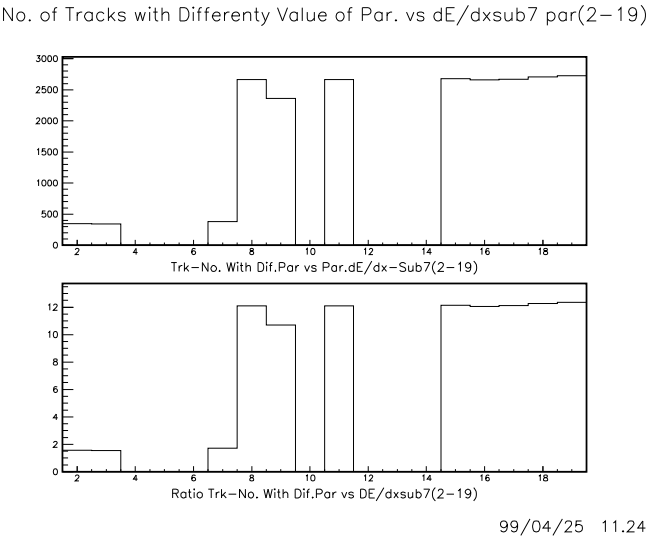
3.5 The Comparison of the Parameters for the subtype 6

The PAR DIF of subtype 6(MU) is shown in the Fig. 5, the first plot is the absolute PAR DIF track numbers virus each parameter of the subtype 6. The second plot is the percentage ratio of the PAR DIF track numbers virus virus the parameters of the subtype 6. From this plot, we can see the the difference of the parameter 2 is less than 0.2%.



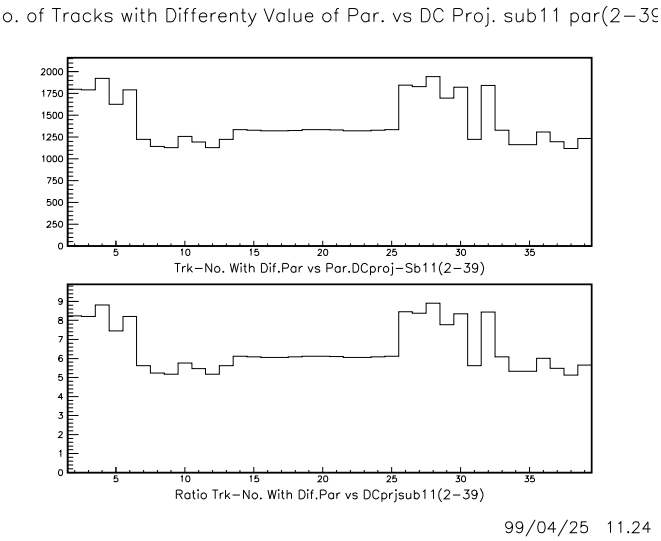
3.6 The Comparison of the Parameters for the subtype 7

The PAR DIF of subtype 7(dE/dx) is shown in the Fig. 6, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 7. The second plot is the percentage ratio of the PAR DIF track numbers virus the parameters of the subtype 7. From this plot, we can see the differences of some parameter is around 12%.



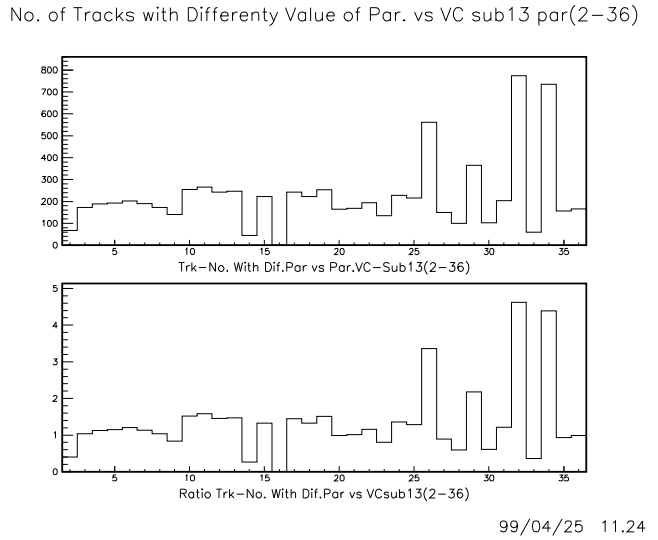
3.7 The Comparison of the Parameters for the subtype 11

The PAR DIF of subtype 11 is shown in the Fig. 7, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 11. The second plot is the percentage ratio of the PAR DIF track numbers virus the parameters of the subtype 11. From this plot, we can see the difference of most parameters is from 5% to 8%.



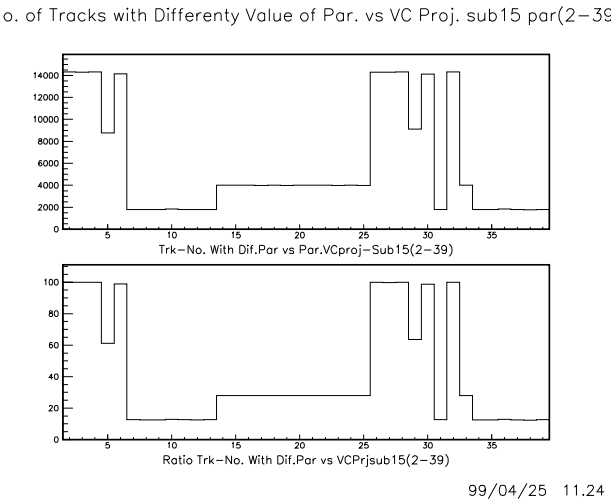
3.8 The Comparison of the Parameters for the subtype 13

The PAR DIF of subtype 13 is shown in the Fig. 8, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 13. The second plot is the percentage ratio of the PAR DIF track numbers virus the parameters of the subtype 13. From this plot, we can see the differences of parameters is from 1% to 4%.



3.9 The Comparison of the Parameters for the subtype 15

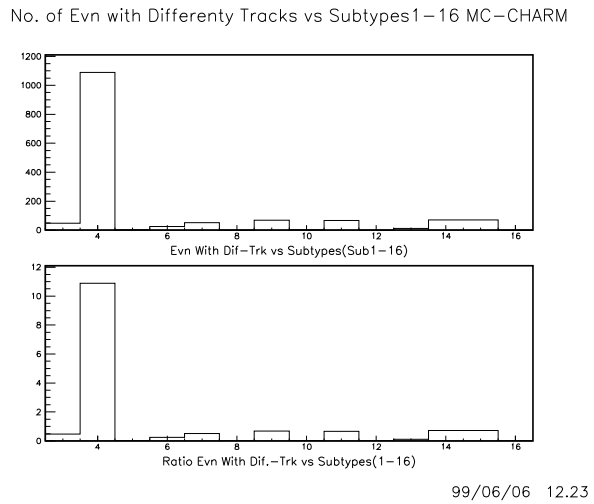
The PAR DIF of subtype 15 is shown in the Fig. 9, the first plot is the absolute PAR DIF track numbers virus the parameters of the subtype 15. The second plot is the percentage ratio of the PAR DIF track numbers virus the parameters of the subtype 15. From this plot, we can see the differences of parameters is from 20% to 100%.



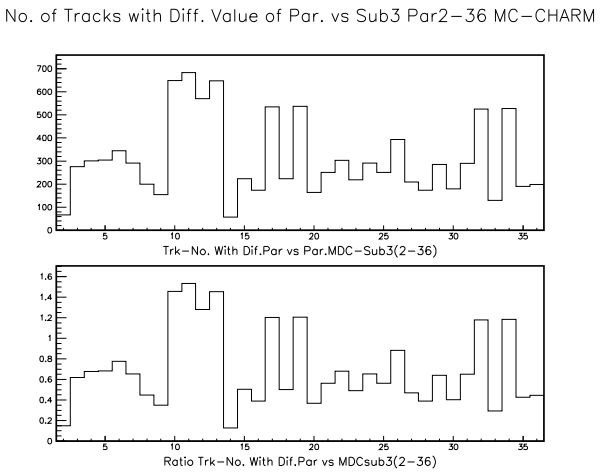
4 The Comparison of BES Reconstruction System of the HP and LINUX(V101) by MC data

The Fig. 10 to Fig. 18 are the same plots as above, using the MC data inclusive hadronic events(by Dr. chen.jiang.chuan's program) in $\psi\prime$ energy region. From those plots we can see that there are still some differences between the HP and PC, although the noise in MC data is much less than in real data.

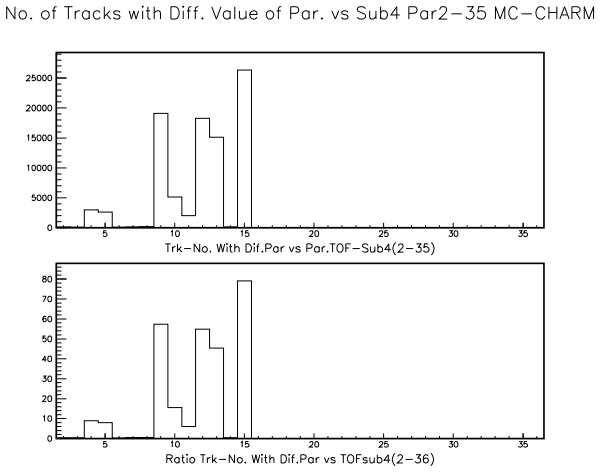
4.1 The Comparison of the track No. for the each subtype



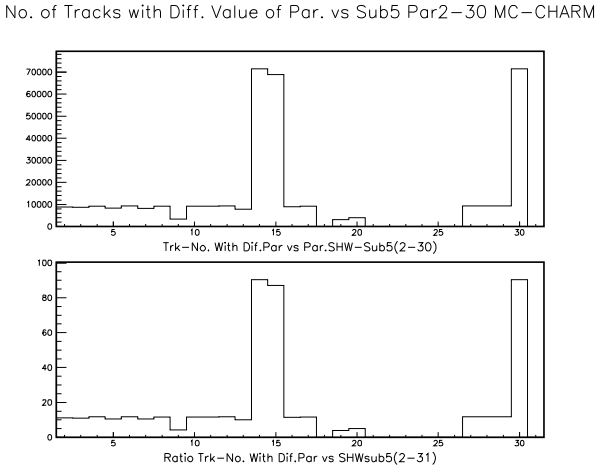
4.2 The Comparison of the Parameters for the subtype 3



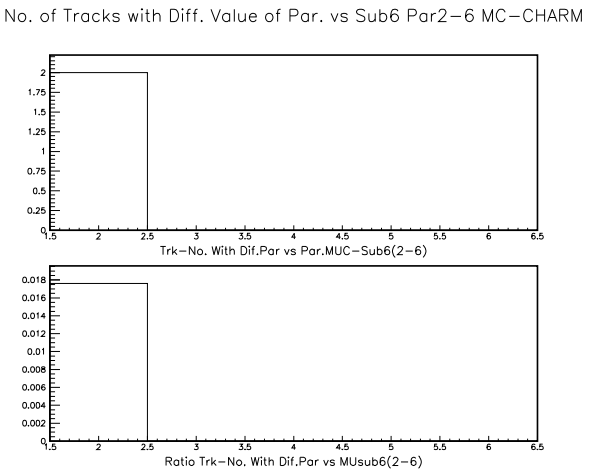
4.3 The Comparison of the Parameters for the subtype 4



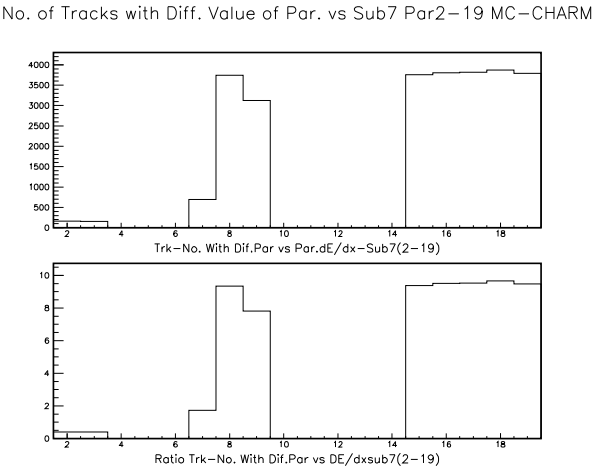
4.4 The Comparison of the Parameters for the subtype 5



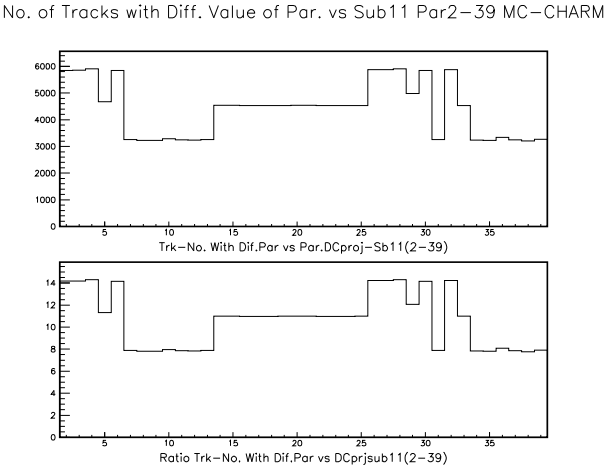
4.5 The Comparison of the Parameters for the subtype 6



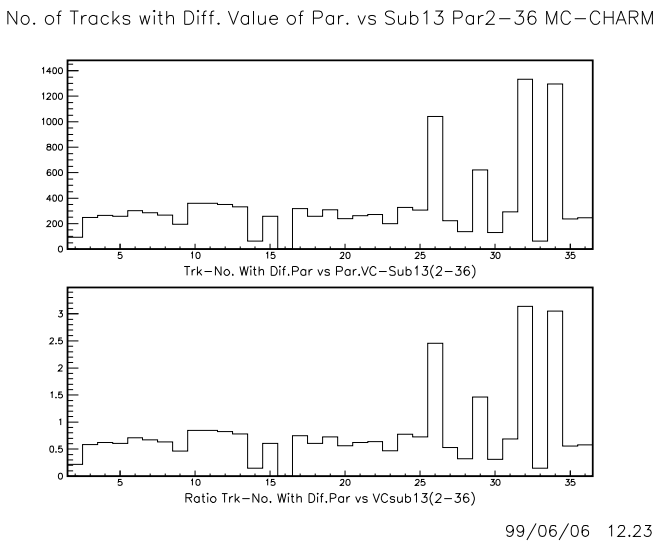
4.6 The Comparison of the Parameters for the subtype 7



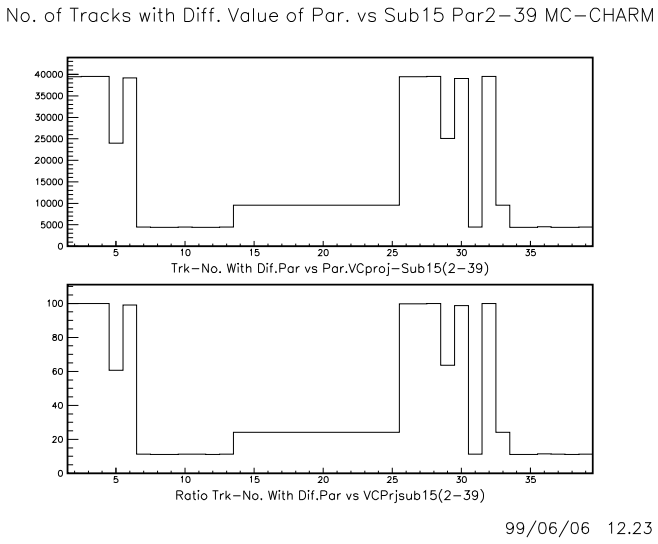
4.7 The Comparison of the Parameters for the subtype 11



4.8 The Comparison of the Parameters for the subtype 13



4.9 The Comparison of the Parameters for the subtype 15

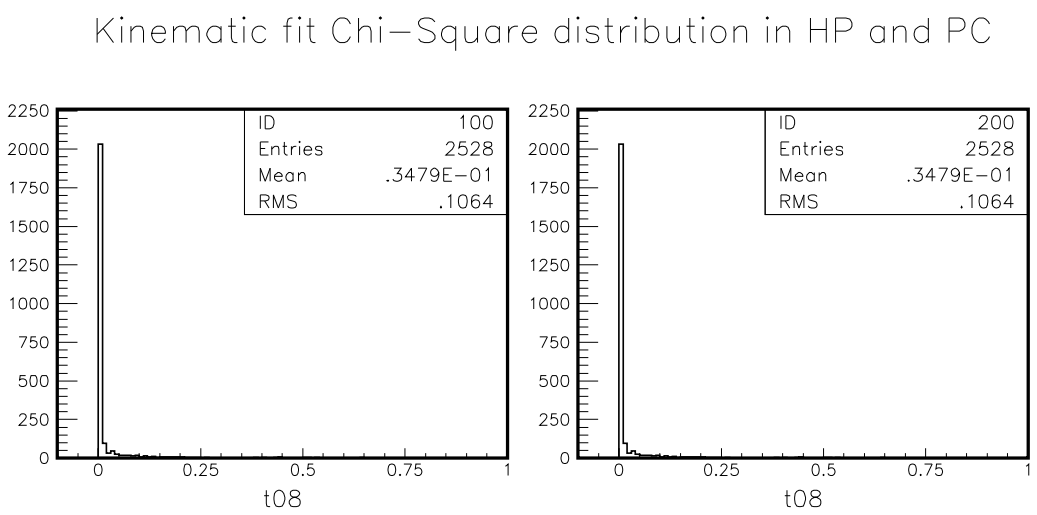


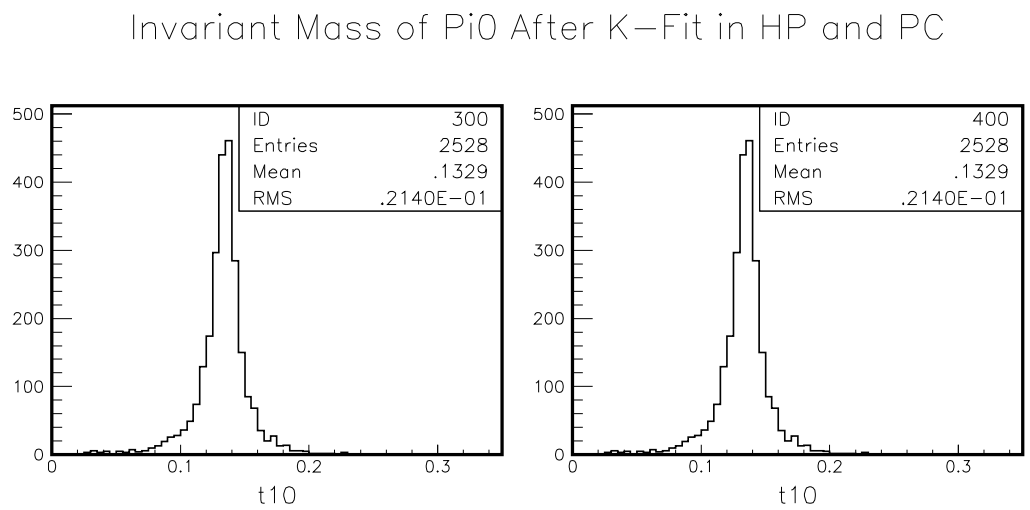
5 The Checking of kinematic fit(newsquid) System of the HP and LINUX(V101) using MC Data

The very roughly checking by the physics analysis is done by the the P $\bar{p}$ analysis program wroted by Dr. Li Haibo, the data sample is the P$\bar{p}$ π^0 events. The data reconstructed in the HP machine, then make the analysis in HP and PC respectively. following is the events selection information and the fitting plots.

Table 1. The compairson of the analysis codes between PC and HP

cut conditions	Events Passed in HP	Events Passed in PC
Charged Track=2	8647	8647
Neutral Track GE. 2	6128	6128
Good Neu. Track GE 2	4535	4535
Theta Angle Cut	3785	3785
MFit=1 -19 -9	3724	3724
Tot Charge=0	3717	3717
Kinematic fit	2528	2528





6 The Summary

- The summary of the comparison of track list between the HP and PC using the real data is listed in the table 2. we can see some subtyp has large differences in this tow system

Table 2. The Differences of Track No. and the Track Parameters of HP and PC from real data(run12054).

Subtype No.	Eve.(%) with Diff. Trk No.	Trk(%) with Diff. Par.
3	∼1	∼3
4	∼6.5	∼0.7
5	0	∼0.2
6	∼1	∼0.2
7	∼1	∼ 7
11	∼1	5–8
13	∼0.8	3–5
15	∼1	20–100

- The Results of the comparison of track list between the HP and PC using the MC data is listed in the table 3. The differences is much small than that frm real data, but still have differences between the HP and PC.

- The Roughly checking for the kinematic fitting codes has done by MC data ($P\bar{p}\ \pi^0$), The results indicates this this parts no problem.

- We will solve the differences between the HP and PC system in next step, now we have found some bugs that caused the problem, we hope solve this problem soon.

- About the event generation and BES detector simulation codes, Dr. Li Canguo will give the details checking and report.

Table 3. The Differences of Track No. and the Track Parameters of HP and PC from MC data

Subtype No.	Eve.(%) with Diff. Track No.	Trks(%) with Diff. Par.
3	∼0.5	0.2-1.6
4	∼11	0-80
5	0	0-80
6	∼0.2	∼ 0.02
7	∼0.5	∼ 0-10
11	∼0.5	5–8
13	∼0.1	3–5
15	∼0.5	20–100