A plan for improvement of BES detector in next 3-5 years

We are making a plan for improvement of BES detector in next 3-5 years stable running and for application of more operation fee .

The aging problem and life time of detector we should to consider.

There are three parts in BES detector:

Detector:	Vc ,MDC ,TOF , BSC....
DAQ system:	Electronics , Online ,Trigger ....
Support system:	HV, Power, Gas, Cooling....

There are 18 subsystems. The status are following:

Status	number	subsystem
New & good	1	BTOF
New with problems	3	Vc, MDCII ,LUM.
Old with part of new	3	Trig. Online, CPU
11 yeas old systems	11	ETOF,ESC,......

The break down in this run:

Cables & connectors	53
HV & electronics	68
Online crash	96
Water & air condition	14
Line power	3
Tatol	234

Wires broken:

BSC	10
MDC	2

The report for application of more operation fee include four parts:

- Status of BES detector
- Estimate of operation fee for each detector
- Big issue to be considered
- Construction of laboratory for Calorimeter ,Crystal Detector, Gas Chamber , Electronics for DAQ

Following issue are what we need to consider for next 3 years stable running

1. How long does The MDCII work stable and how to keep the low noise level ?

   How to keep the low temperature and low humidity ?
2. BSC has been operated 10 years and worked at SQS mode. The aging effect has been seen. We only improved the HV distribution and gas system. The concentration of n-pantane is $\approx$ 30% before into BSC and $\approx$27% after detector. Where the n-pantane is ?There are 1600 l of n-pantane lost. Do we still use the working gas ? What is the life time of BSC?
3. The data from end part detector didn't use for physics analysis .It is about 11% of events were lost because of bad performance of ETOF . Do we need to build a new ETOF?
4. The power supply of magnet was built 11 years before. All of the components need to be changed. The stability is getting worse . Build a new one or only change some components?
5. Too much time need to open the door for repairing of inner detector. How to change the mechanism to open the door quickly ?.

What should we do in next 3 years

Vc:

Change the HV boards ,pre-amplifer boards, signal connectors , cables , study noise & the aging affect.

MDC:

Keep the temperature below 25 c^o and humidity lower than 50%.Build MDCIII.

BSC:

Study the aging problem and search for new working gas . Start R&D of new type shower counter: Pb+Scin. Pb+ fiber ; crystal CsI

Trigger system:

Change the crates , modules , connectors , cables . Need change the system from CAMAC to VME, use the FPGA , DSP technique .

DAQ:

Study of the crash problem . Renew the VME repeater, PC board , Disk , memory .
Build a new VME slow control system for taking data of HV, gas, water ,magnetic field, BEPC,...

Lum. Monitor:

Study the background and correction .Move the monitor back from IP , make new P counters and C counters,

Gas system:

Keep the temperature of the gas before into the n-pantane tank.

Magnet power supply:
Build a new one with new technique.

HV power supply:
Need more spare parts(crates with control, HV modules,)

CPU power :
Need to increase by factor 3-4 and disc space need to increase from 200G t0 400G

Big Issues Needed to Discuss

- **Do we build a new BSC ? When do we finish R&D program and make final decision?**
- **Do we change the ESC , ETOF in three years ?**
- **Do we need to organize a team including both BEPC and BES peoples to deal with the automatic mechanism to open the door?**
- **When do we move the MDCIII to BES ? What is the principle to change the MDCII?**
- **Which way is good: build a new BES detector totally or change some subsystem ?**

A plan for taking data of 50M J/ψ

It is a big job. we should know that and answer:

What is the difference between R run and J/ψ run?

What should we pay more attention in J/ψ run ?

What are the requirements of 50 M in J/ψ run?

R run	J/ψ run
Inclusive	Exclusive
Absolute	relative
Wide range of E	Ecm = 3.095
important :	Important:
L, background , ε	δE/E, δP/P , particle ID
Short Running time	Long running time

We need to have a team to deal with the issue and need to make a plan in this summer.

We need a pre-running before 50M data taking to determine the condition of BEPC, BES including software and hardware.