Status of the BESIII Experiment(in 2009)

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Introduction

- Starting from March of 2009, BES-III successfully collected 100 million $\psi(2S)$ events and 200 million J/ψ events.

- Performances of the BESIII detector and selected preliminary physics results are shown.

Status of BEPCII

- After a 1.5-month synchrotron radiation run and a winter maintenance, the machine resumed collision and its luminosity gradually improved from $1*10^{32}cm^{-2}s^{-1}$ to $3*10^{32}cm^{-2}s^{-1}$.

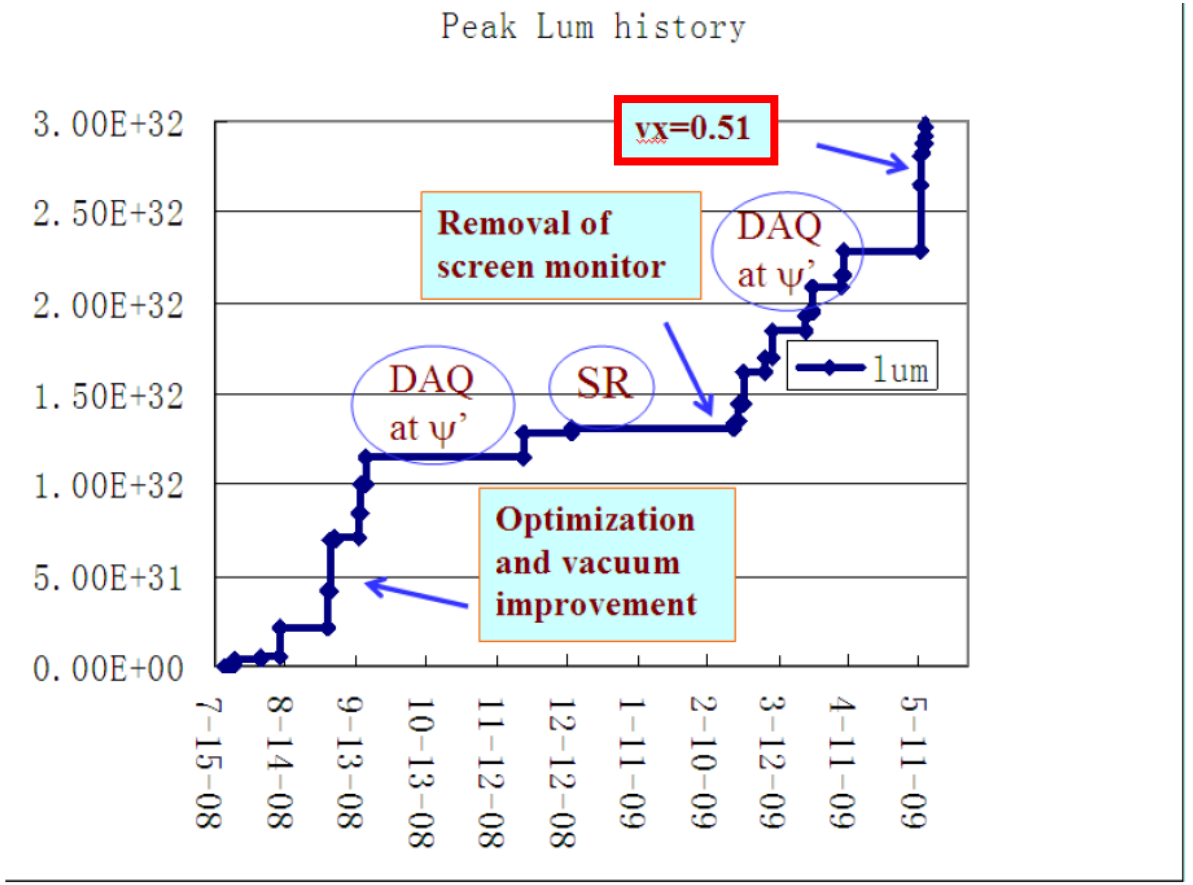


Figure 1: The improvement of the BEPCII luminosity over time.

Status of BEPCII

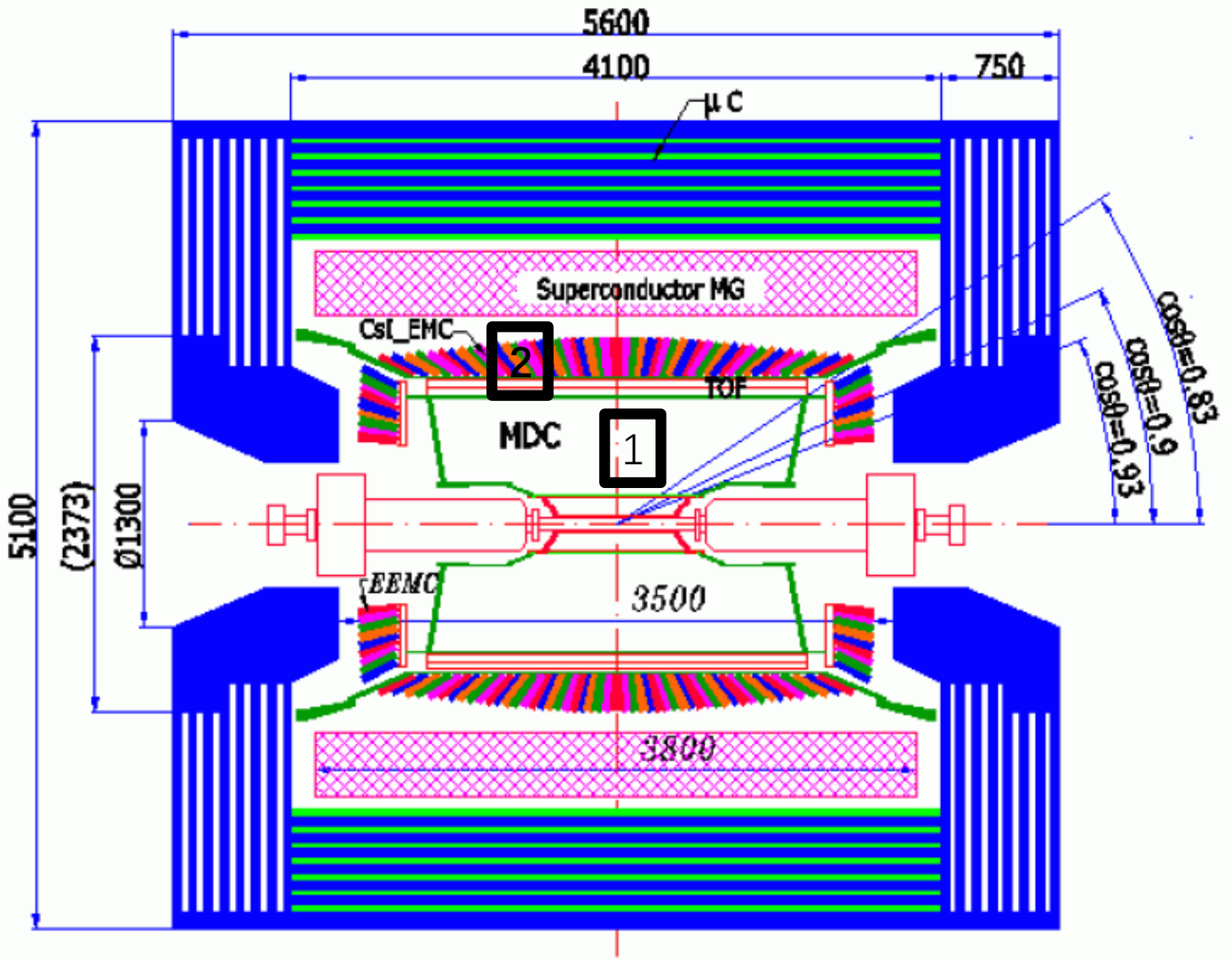
- Until May of 2009, the main parameters of the storage rings achieved in the collision mode compared to the designed values are listed in the following table.

Parameters	Design	Achieved	
		BER	BPR
Energy (GeV)	1.89	1.89	1.89
Beam curr. (mA)	910	650	700
Bunch curr. (mA)	9.8	>10	>10
Bunch number	93	93	93
RF voltage	1.5	1.5	1.5
*ns @1.5 MV	0.033	0.032	0.032
β_x^*/β_y^* (m)	1.0/0.015	1.0/0.016	1.0/0.016
Inj. Rate (mA/min)	200 e^-/ 50 e^+	>200	>50
Lum. (10^{33}cm^{-2}s^{-1})	1.0	0.3	

Table 1: Main parameters achieved in collision mode compared to the designed values

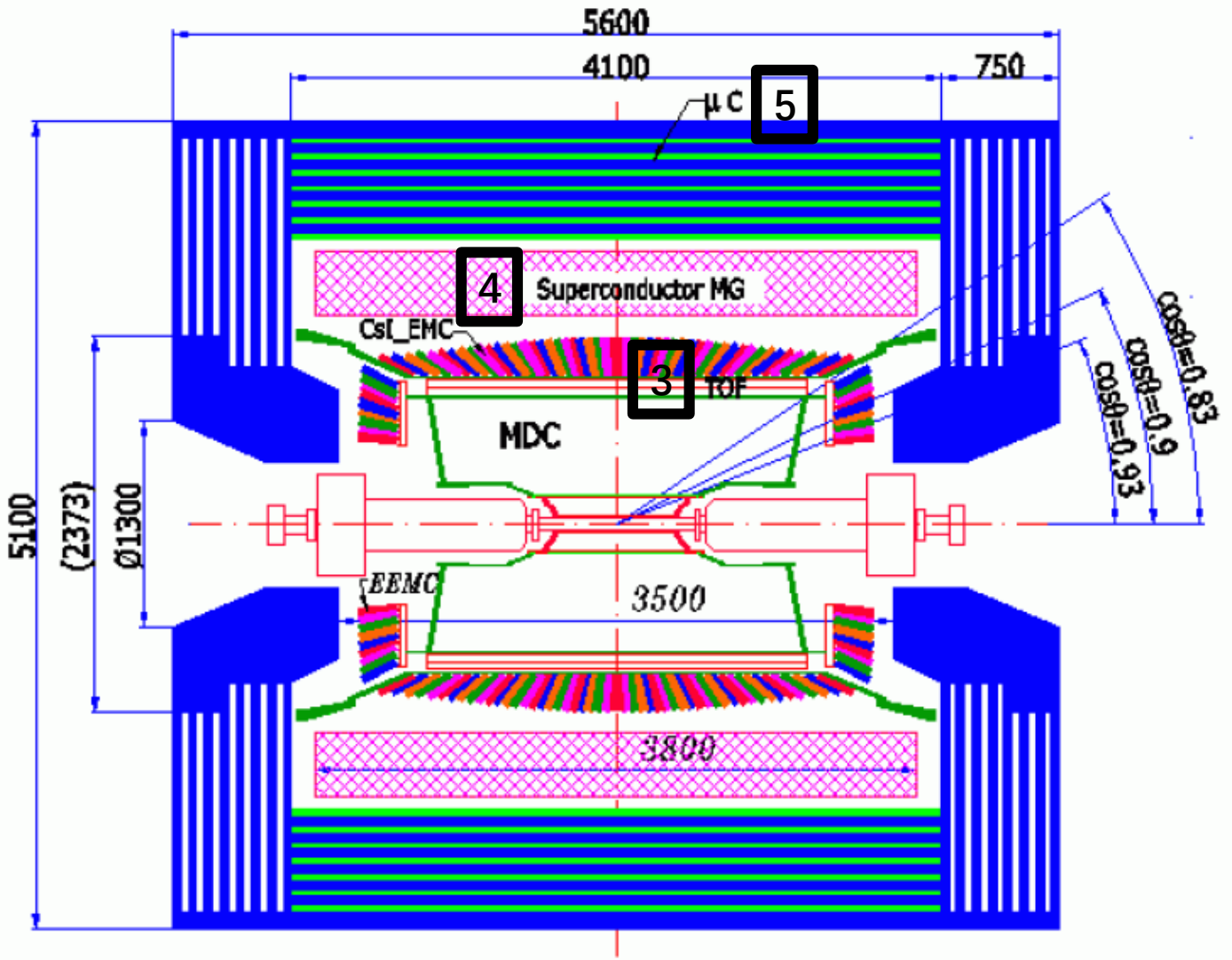
Performance of the BESIII detector

- The BES-III detector:
  - 1) a main drift chamber(MDC) equipped with about 6500 signal wires and 23000 field wires arranged as small cells with 43 layers. The designed single wire resolution is 130um and the momentum resolution is 0.5% at 1 GeV
  - 2) an electromagnetic calorimeter(EMC) made of 6240 CsI(Tl) crystals. The designed energy resolution is 2.5%@1.0 GeV and position resolution is 6mm@1.0 GeV



Performance of the BESIII detector

- The BES-III detector:
  - 3) a particle identification system using Time-Of-Flight counters made of 2.4 m long plastic scintillators. The designed resolution is 80 ps for two layers, corresponding to a K/π separation (2 level) up to 0.8 GeV
  - 4) a superconducting magnet with a field of 1 tesla
  - 5) a muon chamber system made of RPC



Performance of the BESIII detector

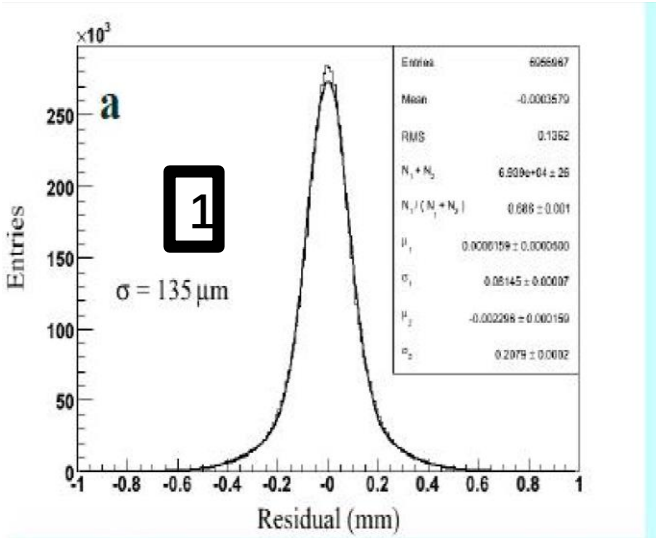
Main parameters performance of the calibrated BES-III detector:

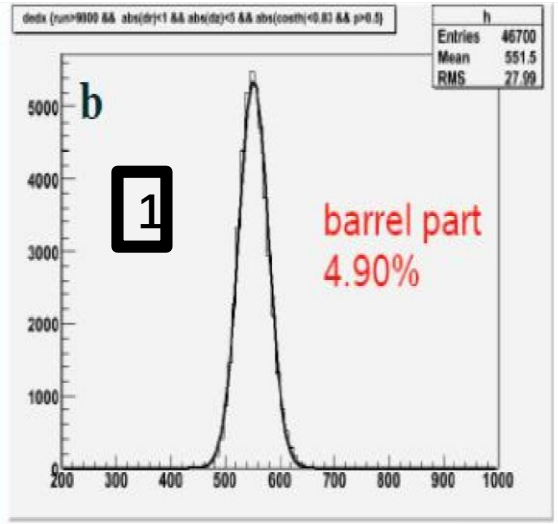
a) single wire resolution of the drift chamber;

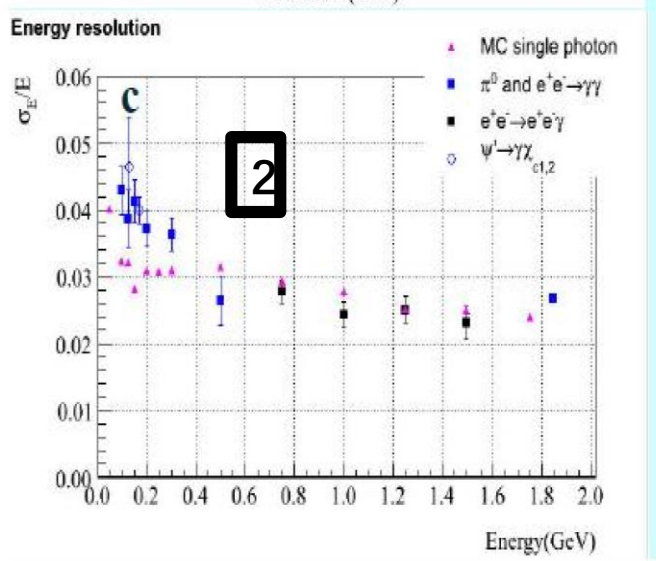
b) dE/dx resolution of the drift chamber in the barrel part;

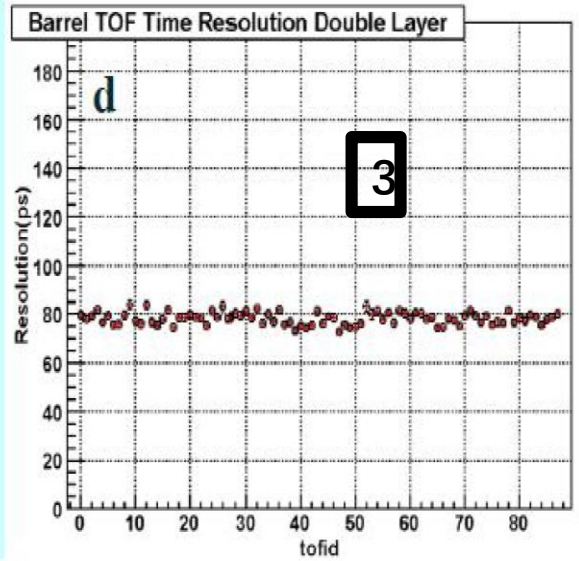
c) energy resolution of the CsI(Tl) crystal calorimeter as a function of photon energy from different physics processes;

d) time resolution of TOF counters averaged over two layers for each counter ID in phi direction.



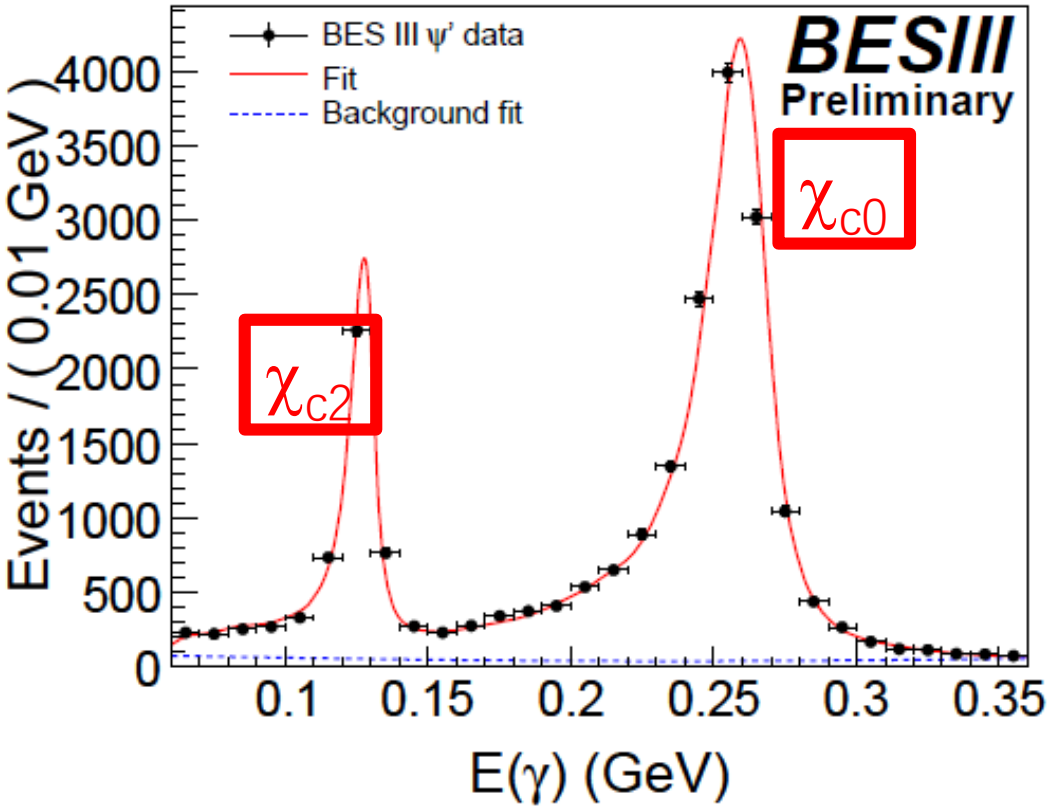


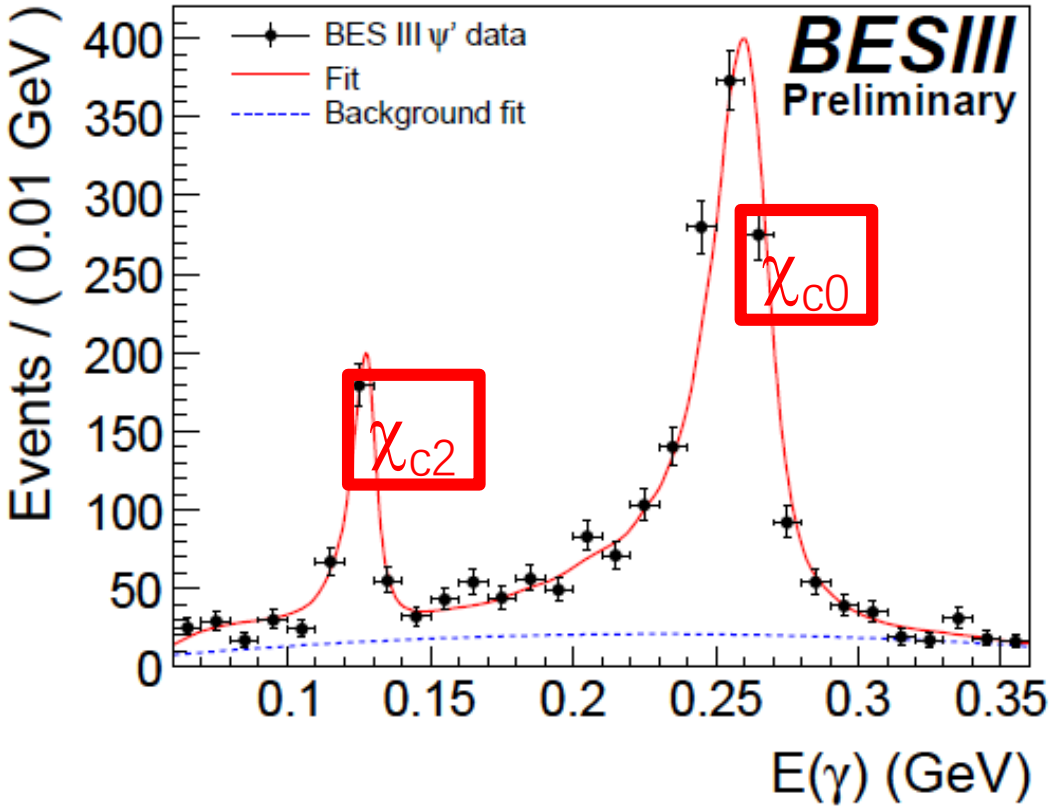




Preliminary physics results

The pictures below are prompt photon spectrum from $\psi(2S)\to\gamma\pi^0\pi^0$(left) and $\psi(2S)\to\gamma\eta\eta$ (right). Signals from χ_{c0} and χ_{c2} are observed and their branching ratios are measured.





Preliminary physics results

The last member of the charmoniuum family below the open charm threshold called h_c was observed by CLEO-c in 2005 from $\psi(2S)$ decays to $\pi^0 h_c$, hc->$\gamma\eta_c$. The pictures below are BESIII results.

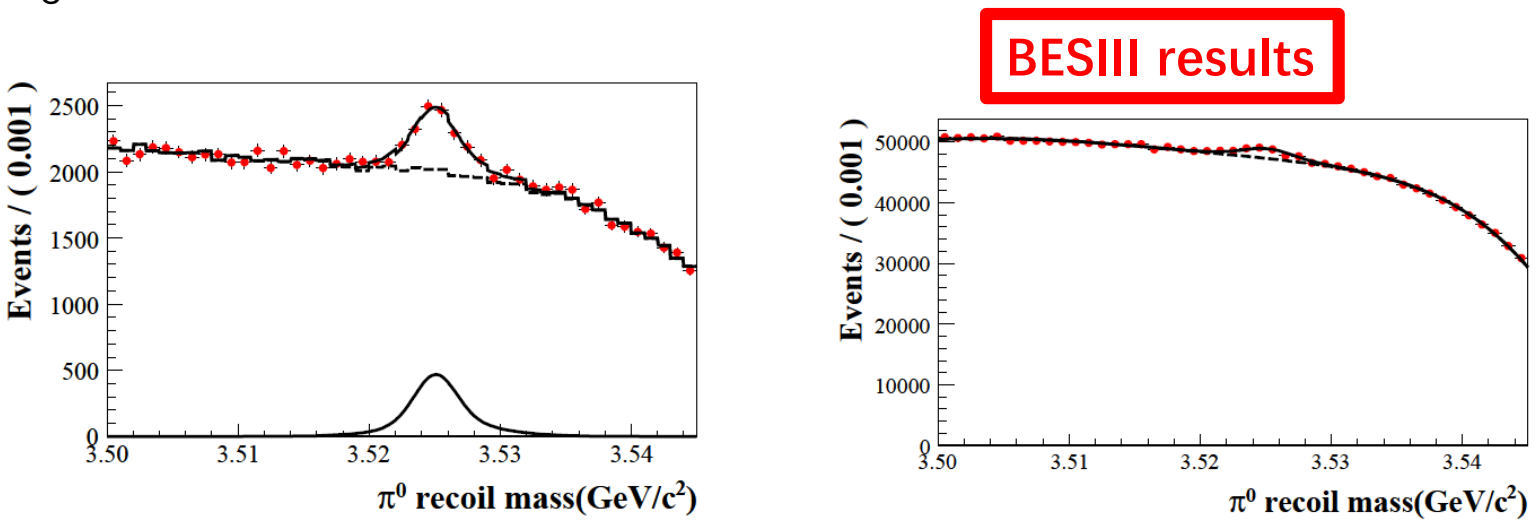


Figure 10: h_c observed in BES-III. Left: tagging the prompt photon in the $h_c \to \eta_c$ decays, right: tagging π^0 from $\psi(2s) \to \pi^0 h_c$ decays.