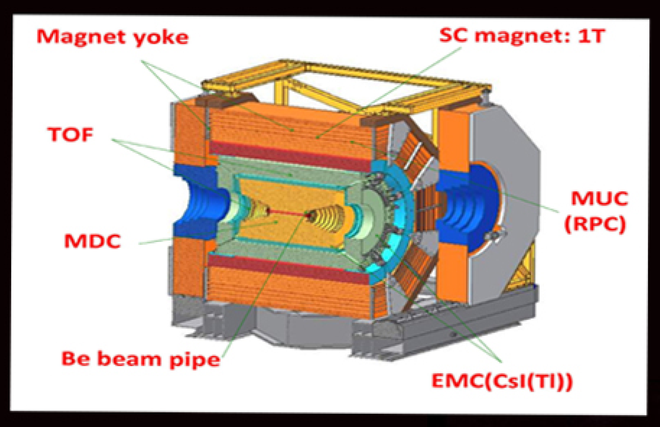
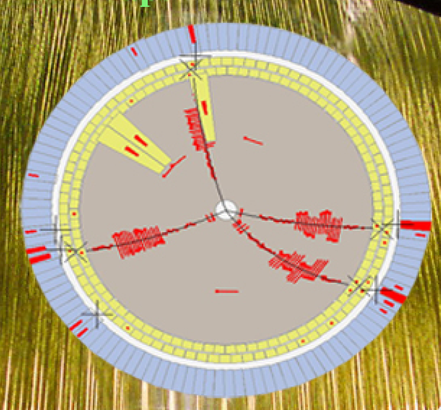
BESIII Experiment

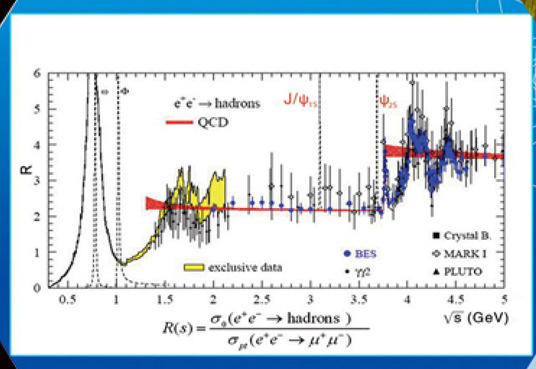


BESIII: a large solid-angle magnetic spectrometer at Beijing Electron-Positron Collider (BEPC) for studies of Tau-charm physics.
MDC: small-celled, helium-based, 43 layers, wire reso: 135 m, dE/dx reso: 6%
EMC: CsI (Tl) crystals arranged in barrel and two endcaps., 2.5%@1GeV for barrel
TOF: two layers with plastic scintillators, 80ps for barrel TOF
MUC: RPC arranged in 9 layers in the barrel and 8 layers in the endcaps

BESIII started physics run in 2009. Totally about 100M psi' and 200M J/psi events have been collected. BESIII is running for psi (3770) data taking now. Fruitful physics results are coming on the searches of the glueballs, hybrids and multi-quark states, the systematic study of the light hadron spectroscopy, the study of the charmonium production and decays and the precise measurement of CKM matrix elements.



BEPCII Energy 2.0-4.6 GeV

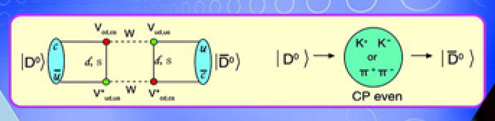


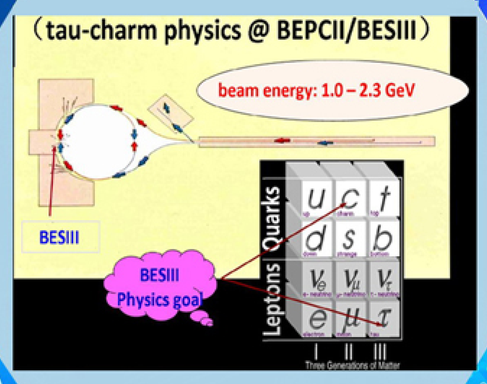
Weak decays of c-quark

$$V_{CKM} = \begin{bmatrix} V_{ud} & V_{us} & V_{ub} \\ V_{cd} & V_{cs} & V_{cb} \\ V_{td} & V_{ts} & V_{tb} \end{bmatrix}$$

Precise measurement of CKM matrix

Test of Standard Model





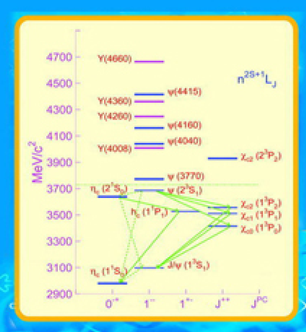
Search for new hadrons

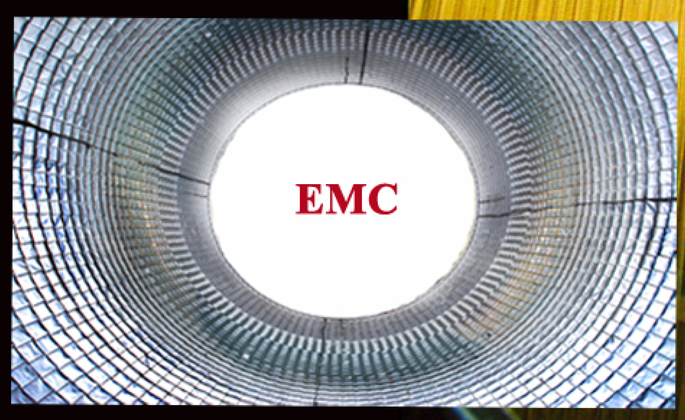
Quark Model

Hadrons: 2 quarks or 3 quarks

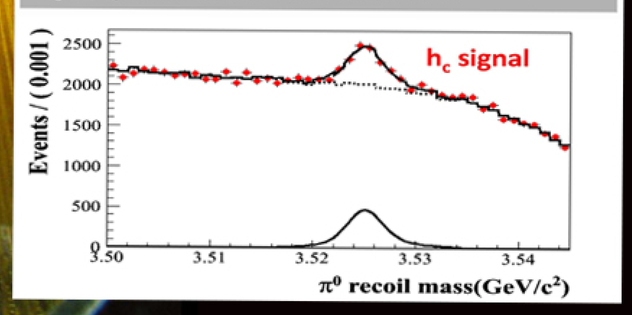
New Hadrons: QCD's prediction
Multi-quark states:> 3 quarks
Hybrid states: ($q\bar{q}g$, qqqg, ...)
Glueballs: (gg, ggg, ...)

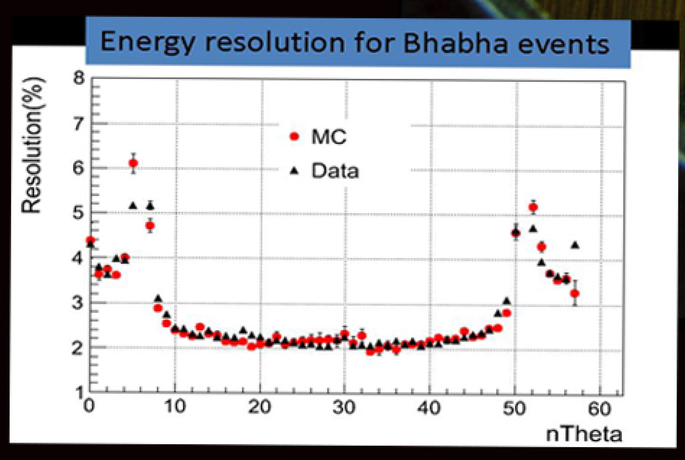
Charmonium production and decay

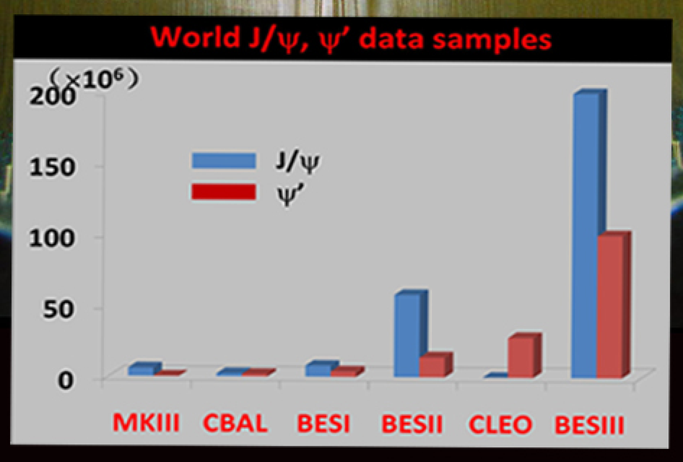




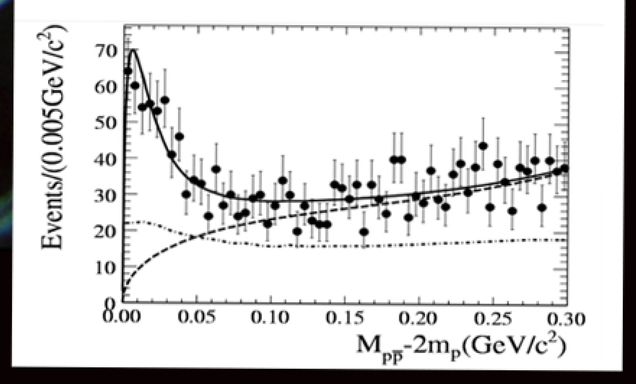
➢ Clear charmonium state h_c is observed at BESIII in $\psi' \to \pi^0 h_c$. The branching ratios of $\psi' \to \pi^0 h_c$ and $h_c \to \gamma\eta_c$ are measured for the first time.







➢ The $p\bar{p}$ threshold enhancement is confirmed.



BESIII Collaboration