Study of $B^0 \to J/\psi\pi^+\pi^-$ decays
with 449 million $B\bar{B}$ at Belle

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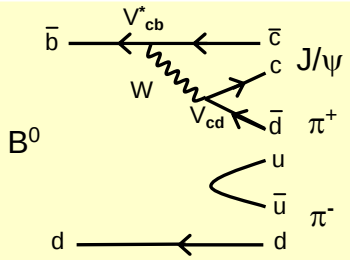
1. Introduction

$B^0 \to J/\psi\pi^+\pi^-$ is caused by $b \to c\bar{c}d$ transition.

How $\pi^+\pi^-$ pairs are produced?
ρ^0? f_2? or other resonance? non-resonant(nr)?

Br. measurement and $M_{\pi^+\pi^-}$ distribution give the answer.
Note : $B^0 \to J/\psi K^0_S$ ($b \to c\bar{c}s$) is not regarded as a signal.

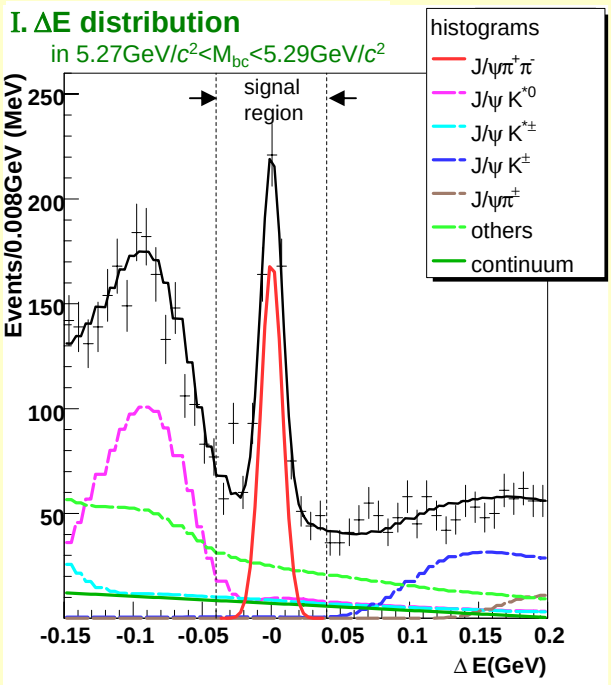


2. Analysis

Combine $J/\psi \to e^+e^-$ or $\mu^+\mu^-$ and $\pi^+\pi^-$ ($K^\pm$ are vetoed) then
use $M_{bc}=\sqrt{(E_{beam})^2-(P_{J/\psi\pi\pi})^2}$, $\Delta E=E_{J/\psi\pi\pi}-E_{beam}$ to reconstruct B candidates.

I. ΔE distribution

in $5.27\text{GeV}/c^2 < M_{bc} < 5.29\text{GeV}/c^2$



Signal extraction with ΔE distribution.

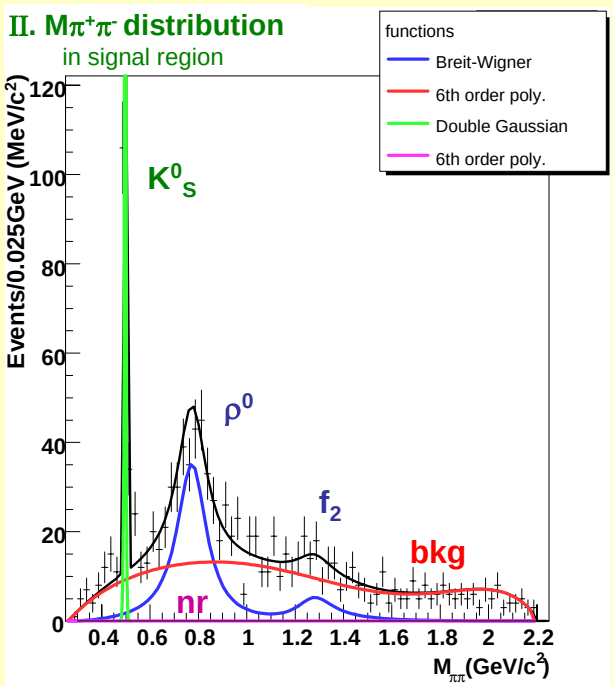
$N(B^0 \to J/\psi\pi^+\pi^-)$	360±41

(efficiency is 0.28)

Background is estimated by the same way for the $M_{\pi\pi}$ sliced samples.

II. $M_{\pi^+\pi^-}$ distribution

in signal region



ρ^0 and f_2 interference is taken into account.
(phase difference is 0.53±0.56 (rad))

$N(B^0 \to J/\psi\rho^0)$	1060±108*
$N(B^0 \to J/\psi f_2)$	111±60*
$N(\text{nr } B^0 \to J/\psi\pi^+\pi^-)$	19±103*

*Note : these are efficiency corrected numbers.

3. Result

preliminary
I. $Br(B^0 \to J/\psi\pi^+\pi^-) = (\ 2.4\pm0.3(\text{stat.})\pm0.2(\text{syst.})\ )\times10^{-5}$

($4.6\pm0.7(\text{stat.})\pm0.6(\text{syst.})\ )\times10^{-5}$ (*BABAR*)

preliminary
II. $Br(B^0 \to J/\psi\rho^0) = (\ 2.0\pm0.2(\text{stat.})\pm0.2(\text{syst.})\ )\times10^{-5}$

($1.6\pm0.6(\text{stat.})\pm0.4(\text{syst.})\ )\times10^{-5}$ (*BABAR*)

Higher precision has been achieved with large data sample.
$B^0 \to J/\psi\rho^0$ is found to be dominant. (contradiction to *BABAR*)