Process of Analysis

XIAO Suyu from IHEP

20180105

Invisible decay ---- Jpsi2invi

- How many invisible particles can be produced?
  - measure number of invisible particles

- How many invisible particles can be produced in given mother partibles?
  - calculate invisible decay branching fraction
  - calculate invisible decay branching ratio to a certain decay channel
    - give a more clear picture to let us understand the branching fraction
    - reduce part of the systematic error

$$\frac{B(J/\Psi \to invisible)}{B(J/\Psi \to \mu^+\mu^-)} = \frac{N_{invi}/(\varepsilon_{invi} \times N_{tot})}{N_{\mu\mu}/(\varepsilon_{\mu\mu} \times N_{tot})} = \frac{N_{invi}/\varepsilon_{invi}}{N_{\mu\mu}/\varepsilon_{\mu\mu}}$$

Invisible decay ---- Jpsi2invi

- How to get the number of invisible particles?
  - number of all particles that decay from jpsi
    - jpsi decays to invisible
  - number of all known particles that decay from jpsi
    - jpsi decays to main contributions of background
      - continuum background
        - con3650
      - peaking background
        - jpsi decays to ee
        - jpsi decays to nn
        - jpsi decays to pp
        - jpsi decays to mumu
        - others

Invisible decay ---- Jpsi2invi

- Why do some visible particles after decaying belong to invisible (especially for ee pp nn)?
  - efficiency

- How to get the number of peaking background?
  - for ee pp nn mumu
    - get number of jpsi2anything
    - branching fraction from PDG
    - efficiency
  - for others
    - mc topology

Invisible decay ---- Jpsi2invi

- What conclusion can we reach?
  - based on the invisible decay particle number, convolute the statistical likelihood, then set confidence level at 90%, getting a upper limit
    - it means which area the final true result should lie on at 90% confidence level
    - the smaller, the better

- What conclusion do we expect?
  - a plus result with small statistical uncertainty

Invisible decay ---- Chic2invi

- Which decay channels should be chosen?
  - signal channel: chic->gam+invisible
  - one alternative compared channel: chic->gam+gam
- What's the main contribution to background?
  - stack background channels

Thanks!