

Group meeting

2025/04/11

Partial wave angular distribution for $\omega J/\psi$

For $X(2^+) \rightarrow \omega(1^-)J/\psi(1^-)$ Helicity Amplitudes are:

$$F_{\lambda\nu}^2 = \begin{pmatrix} F_{11}^2 & F_{10}^2 & F_{1-1}^2 \\ F_{01}^2 & F_{00}^2 & F_{0-1}^2 \\ F_{-11}^2 & F_{-10}^2 & F_{-1-1}^2 \end{pmatrix}$$

From parity conservation:

$$F_{11}^2 = F_{-1-1}^2, F_{10}^2 = F_{-10}^2, F_{1-1}^2 = F_{-11}^2, F_{01}^2 = F_{0-1}^2 \text{ (5 independent Helicity Amplitudes)}$$

Thus,

$$\frac{d\sigma}{d\Omega} \propto \sum_{\lambda\nu} |F_{\lambda\nu}^2 d_{2,\lambda-\nu}^2(\theta)|^2$$

$$= 2|F_{11}^2 d_{2,0}^2|^2 + (F_{10}^2)^2 \left| (d_{2,1}^2)^2 + (d_{2,-1}^2)^2 \right| + (F_{1-1}^2)^2 \left| (d_{2,2}^2)^2 + (d_{2,-2}^2)^2 \right| + \\ (F_{01}^2)^2 \left| (d_{2,1}^2)^2 + (d_{2,-1}^2)^2 \right| + |F_{00}^2 d_{2,0}^2|^2$$

Partial wave angular distribution for $\omega J/\psi$

$$\frac{d\sigma}{d\Omega} \propto \sum_{\lambda\nu} |F_{\lambda\nu}^2 d_{2,\lambda-\nu}^2(\theta)|^2$$

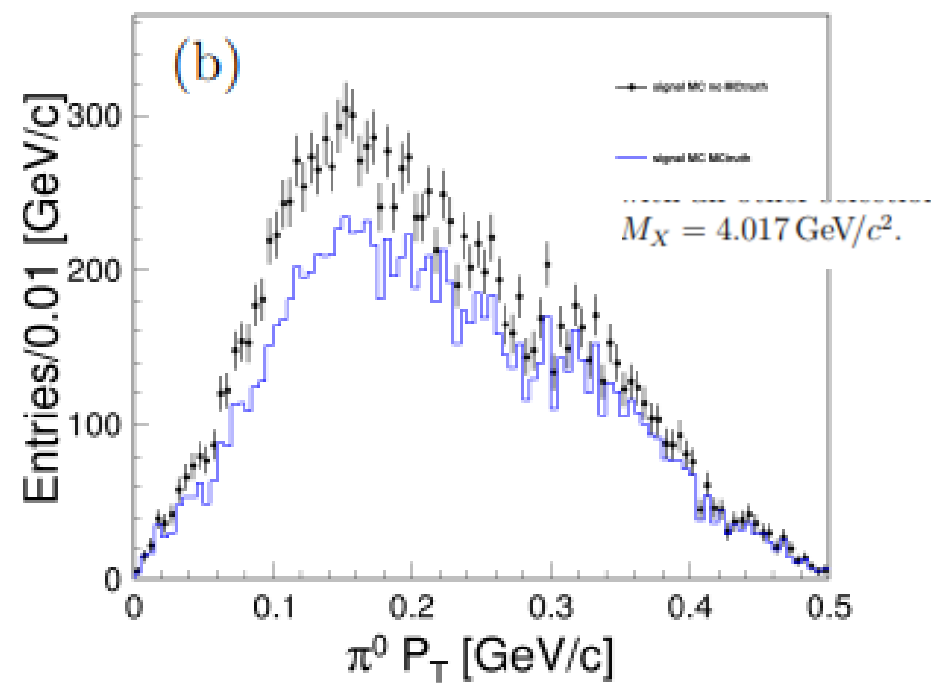
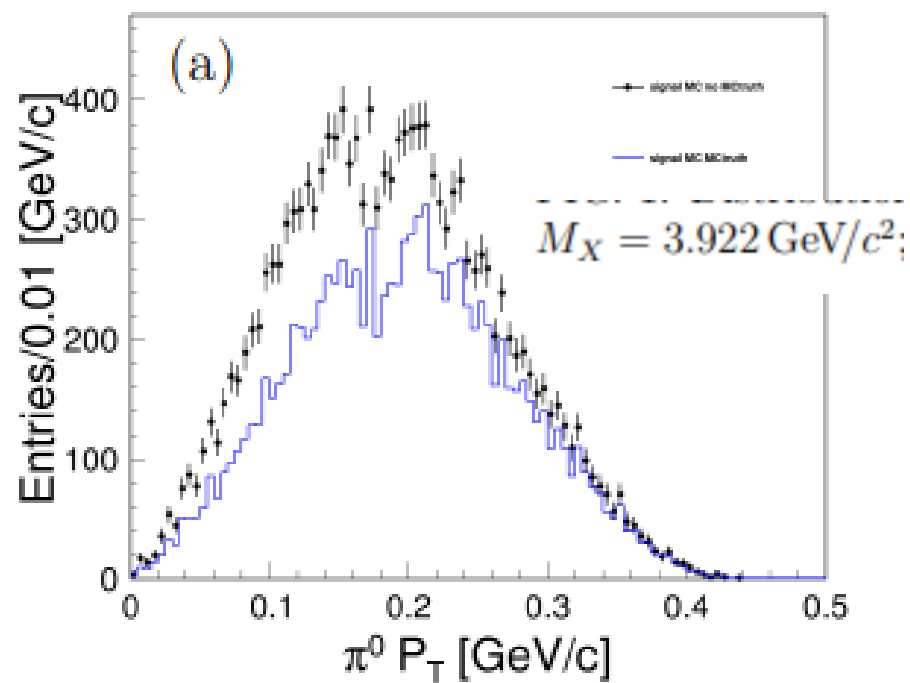
$$= \frac{3}{4} (F_{11}^2)^2 \sin^4 \theta + \frac{1}{2} (F_{10}^2)^2 (\sin^2 \theta (1 + \cos^4 \theta)) + \frac{1}{16} (F_{1-1}^2)^2 ((1 + \cos \theta)^4 + (1 - \cos \theta)^4) + \frac{1}{2} (F_{01}^2)^2 (\sin^2 \theta (1 + \cos^4 \theta)) + \frac{3}{8} (F_{00}^2)^2 \sin^4 \theta$$

Set all Helicity Amplitudes =1 get:

$$\frac{d\sigma}{d\Omega} \propto \frac{9}{8} \sin^4 \theta + \sin^2 \theta \cos^2 \theta + \frac{1}{8} + \frac{3}{4} \cos^2 \theta + \frac{1}{8} \cos^4 \theta$$

```
if (TrepB::pmodel == 502) // 2+ (2) -> 1-1- test
{
    // 2+(0) --> PP
    double cosx2, sinx2;
    cosx2 = zz * zz;
    sinx2 = 1 - cosx2;
    dcs = 1.125 * sinx2 * sinx2 + sinx2 + sinx2 * cosx2 + 0.125 + 0.75 * cosx2 + 0.125 * cosx2 * cosx2;
    return dcs;
}
```

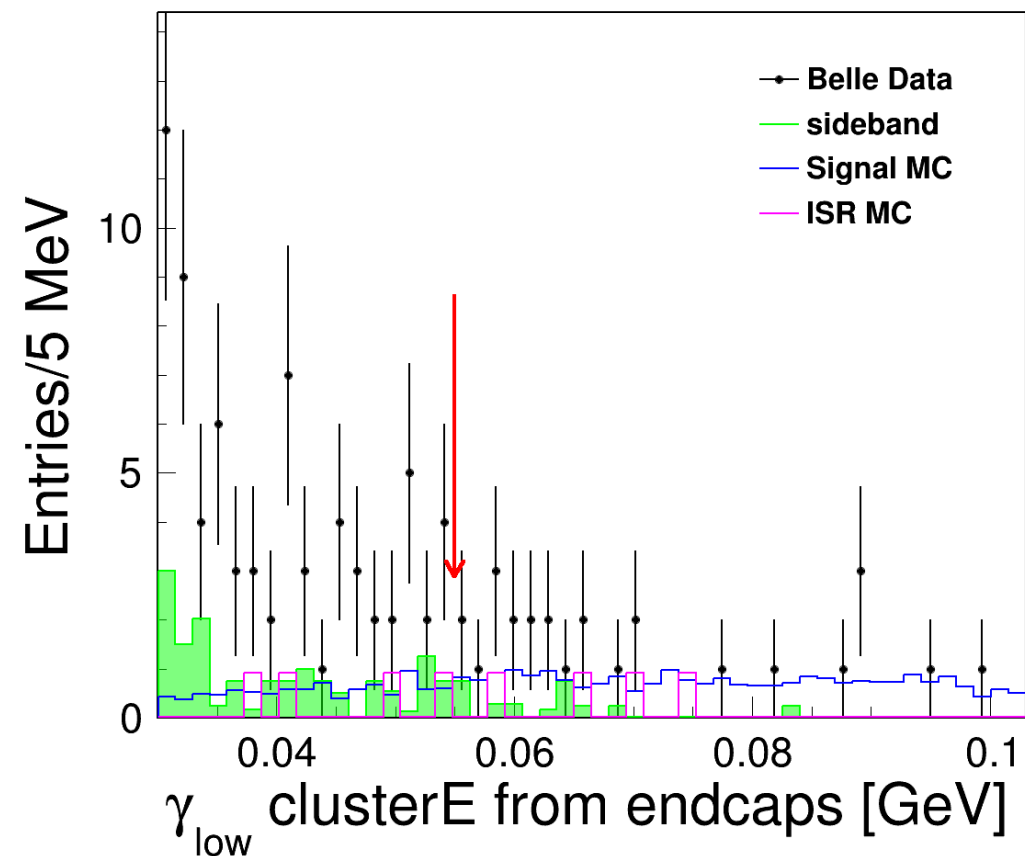
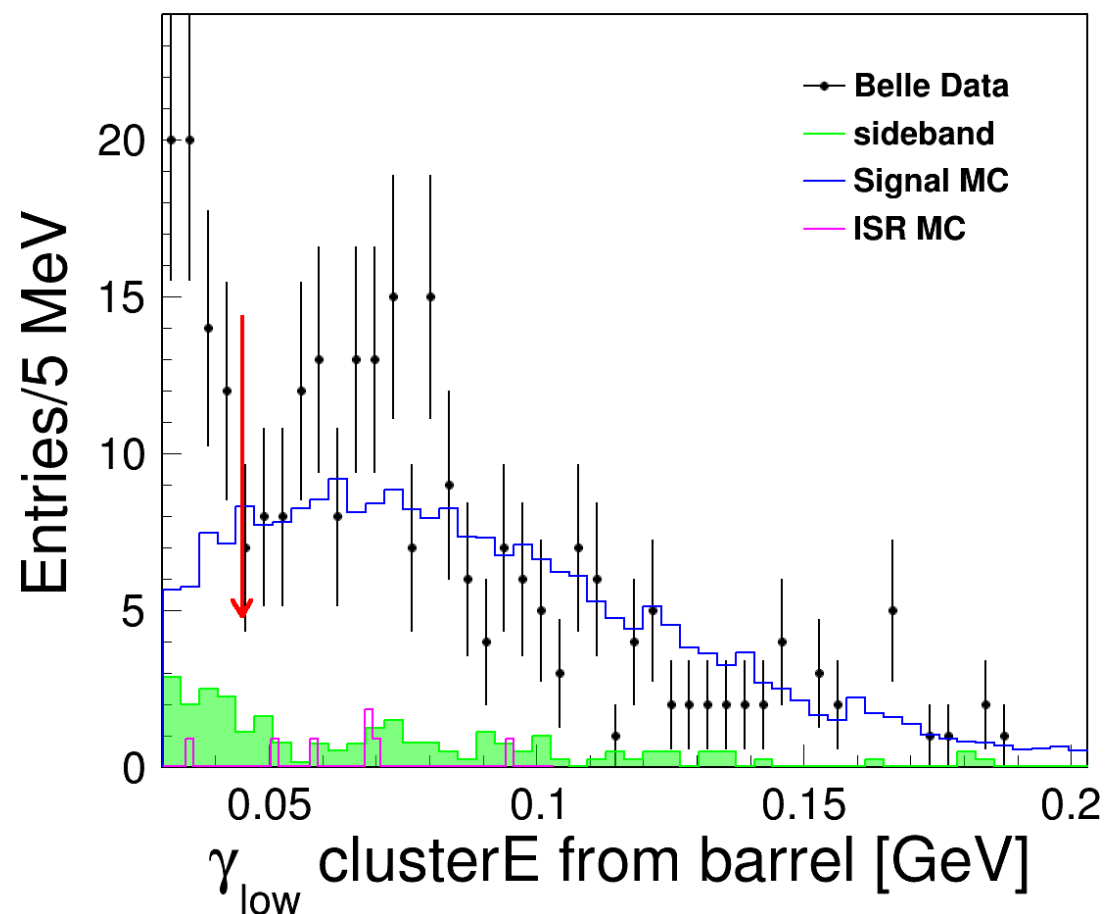
Selection update:



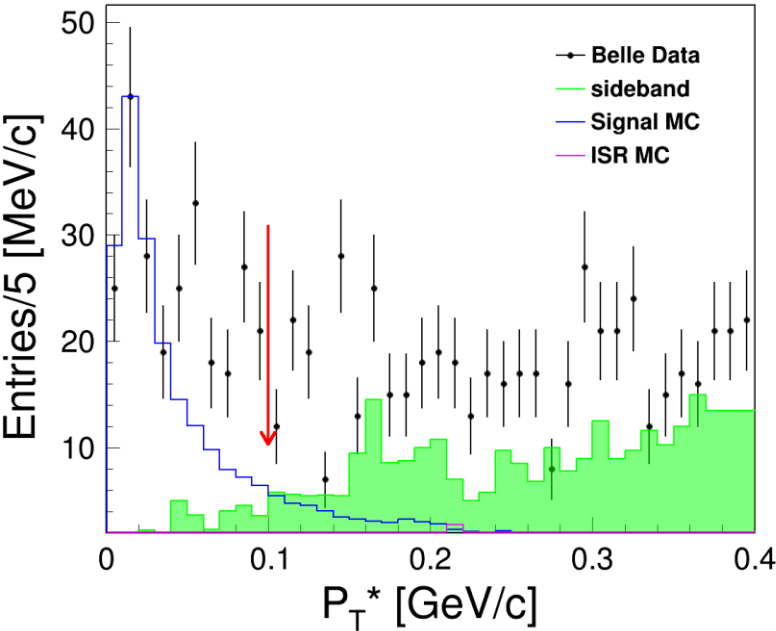
BCS removed, use stricter photon selection criteria.

Selection update:

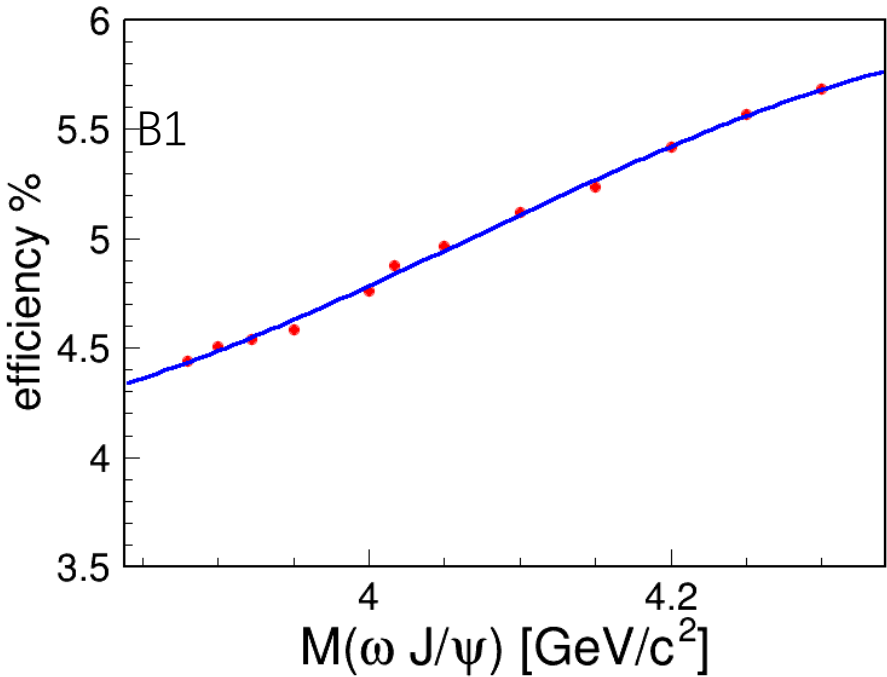
- $\text{clusterE} > 55\text{MeV}$ for endcaps for γ_{low}
- $\text{clusterE} > 45\text{MeV}$ for barrels for γ_{low}



Total Pt and Effcurves:



Try BCS without pt regions



Try B2MC rd

