Q&A on the Measurement of the Run-II Inclusive J/ψ Cross-section

Mary Bishai, Yuri Gotra, James Kraus, Thomas LeCompte, Jonathan Lewis, Dmitri Litvintsev, Ting Miao, Slawomir Tkacyzk, Tomohiro Yamashita

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Propagation of errors

Q1: Have the errors on the total crossection been propagated properly

A1: The total crosssection is a sum of the cross-sections in each pt bin. The momentum dependant systematic uncertainties were added in quadrature for the blessing:

$$\sigma(p\overline{p} \rightarrow J/\psi X, \mid y(J/\psi) \mid < 0.6) \cdot Br(J/\psi \rightarrow \mu\mu) = 239.2 \pm 1.5(stat)^{+8.3 \oplus 14.6}_{-6.4 \oplus 14.6}(syst)$$

A more conservative estimate of the error on the total cross-section was requested. We use the straight sum of the pt dependant uncertainteis $\oplus 6.1\%$ correlated uncertainty. Updated number is :

$$\sigma(p\overline{p} \rightarrow J/\psi X, \mid y(J/\psi) \mid < 0.6) \cdot Br(J/\psi \rightarrow \mu\mu) = 239.2 \pm 1.5(stat)^{+34.2}_{-27.2}(syst)$$

Q2: Value of x-sec in 0-0.25 GeV/c bin

Q2: Why is the first point on the $d\sigma/dp_T$ low?

A2: The generated pt spectrum is reweighed to match the x-section shape to obtain a systematic uncertainty. We find a 3% contrubution. Found weight function was -ve in the lowest bin. Larger MC statistics were generated and smaller pt bin sizes used to calculate acceptance. Finer binning $\Leftrightarrow$ same as reweighing input spectrum.

p_T bin size (MeV/c)	$d\sigma/dp_T$ from 0.0-0.25 GeV/c
50 (new)	9.1 (new)
100	9.0
200	8.4
250* (bless)	7.2 (bless)

Systematic uncertainty of 30% (instead of 3%) in lowest bin in x-section