

Absorption normale: évolution du SPS à RHIC et au LHC

L'absorption du J/ψ et du ψ' dans la matière nucléaire

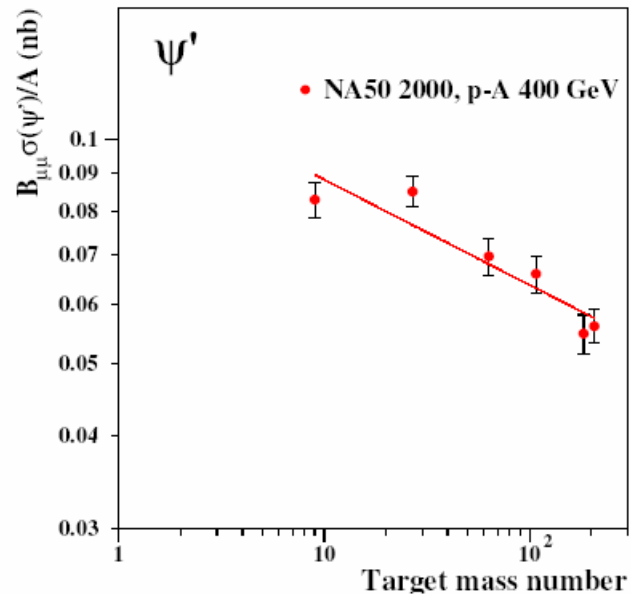
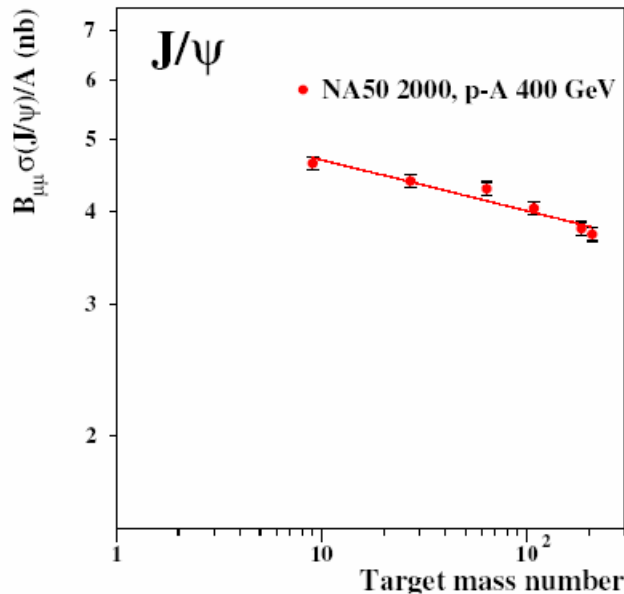
$$\sigma_{p-A}^{J/\psi, \psi'} = \sigma_0^{J/\psi, \psi'} \times A^\alpha$$

$$\alpha^{J/\psi} = 0.931 \pm 0.002 \pm 0.007$$

$(\chi^2/dof = 1.4)$

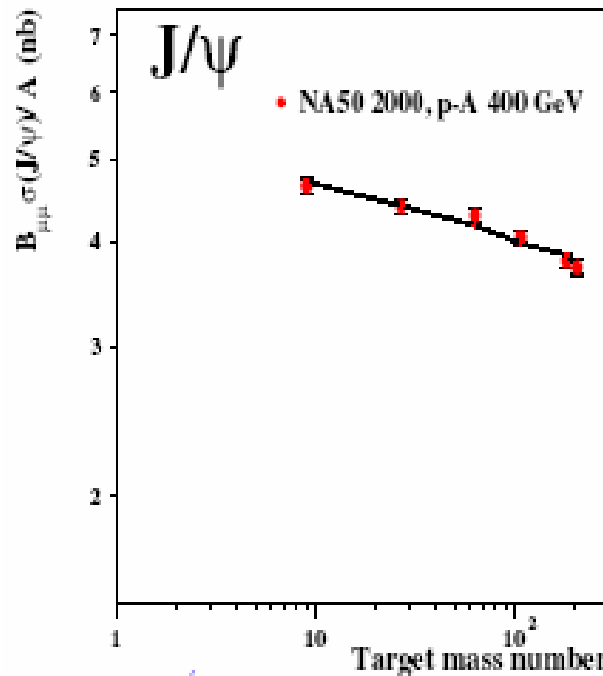
$$\alpha^{\psi'} = 0.858 \pm 0.017 \pm 0.008$$

$(\chi^2/dof = 2.2)$



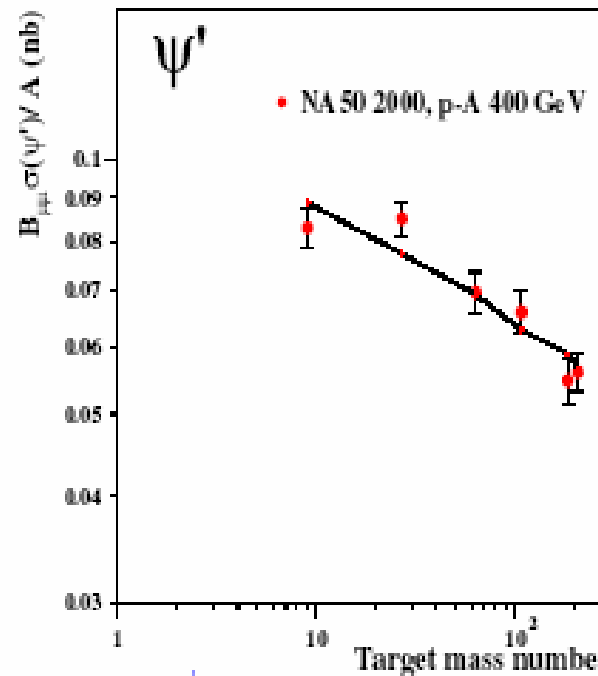
★ Data show a **larger ψ' absorption** as compared to **J/ψ**

σ_{abs} pour le J/ψ et le ψ'



$$\sigma_{\text{abs}}^{\psi} = 4.2 \pm 0.5 \text{ mb}$$

$$(\chi^2/dof = 0.9)$$



$$\sigma_{\text{abs}}^{\psi'} = 9.6 \pm 1.6 \text{ mb}$$

$$(\chi^2/dof = 2.0)$$

- Fit simultané de toutes les données pA (NA50):

$\sigma_{\text{abs}}^{\psi}$ (mb)	$\sigma_{\text{abs}}^{\psi'}$ (mb)	$\sigma_{\text{abs}}^{\psi'} - \sigma_{\text{abs}}^{\psi}$ (mb)
4.3 ± 0.3	7.9 ± 0.6	3.5 ± 0.7

- Anciennes données SU (NA38) réanalysées:

$$\sigma_{\text{abs}}^{\psi} = 7.2 \pm 3.2 \text{ mb}$$

- Fit simultané de toutes les données pA (NA50) et SU (NA38):

$$\sigma_{\text{abs}}^{\psi} = 4.3 \pm 0.3 \text{ mb}$$

Ψ' significativement plus absorbé que le J/ψ

→ Temps de formation du charmonium dans notre domaine cinématique suffisamment petits pour distinguer les 2 états.

QUID A PLUS HAUTE ENERGIE?

NA50 pA (450 GeV)

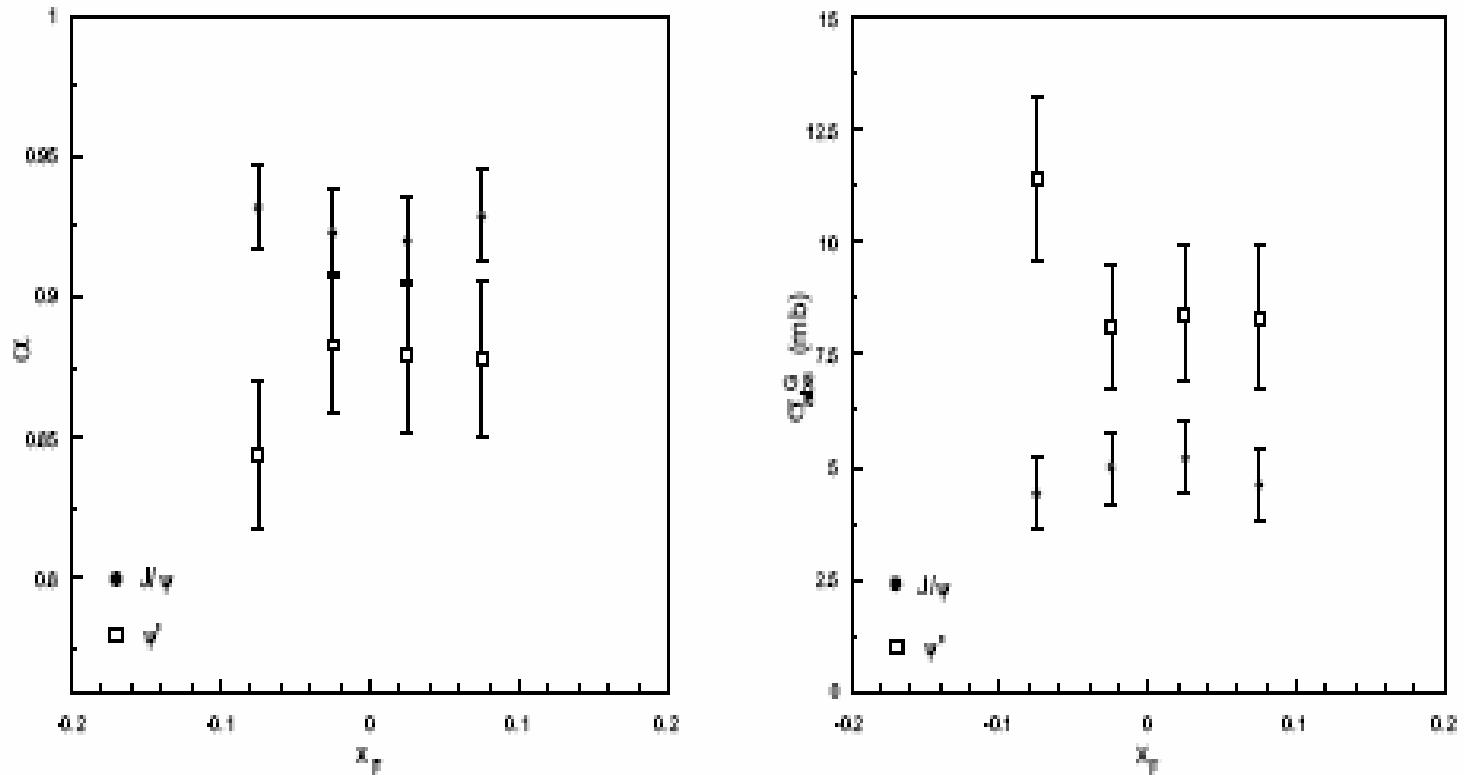
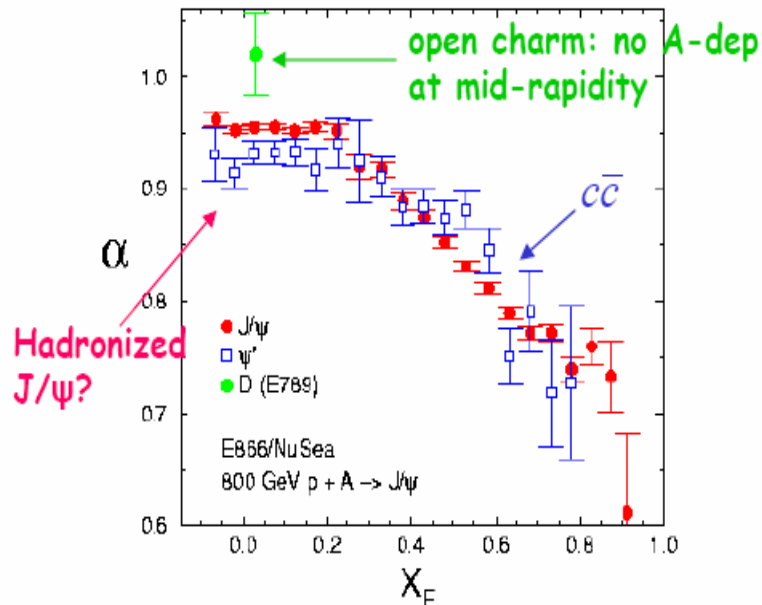
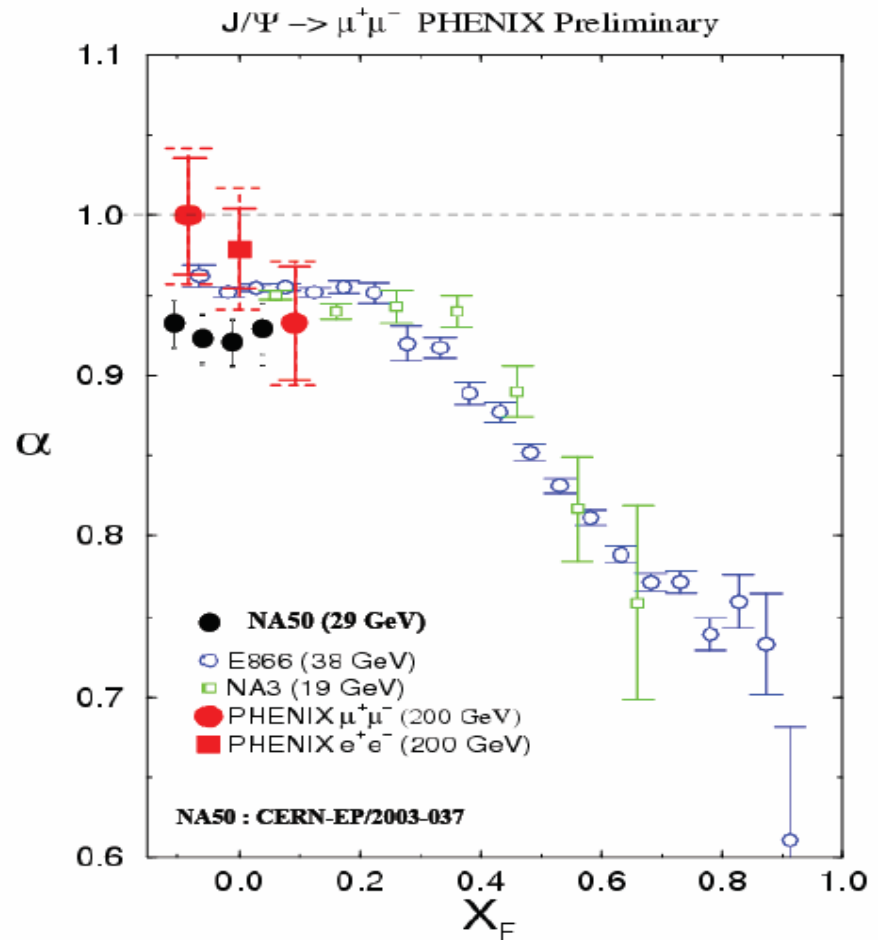


Figure 8: Parameters describing the nuclear absorption of the J/ψ and ψ' charmonium states, α (left) and σ_{abs}^G (right), as a function of x_F .

800 GeV p-A (FNAL)
PRL 84, 3256 (2000); *PRL* 72, 2542 (1994)



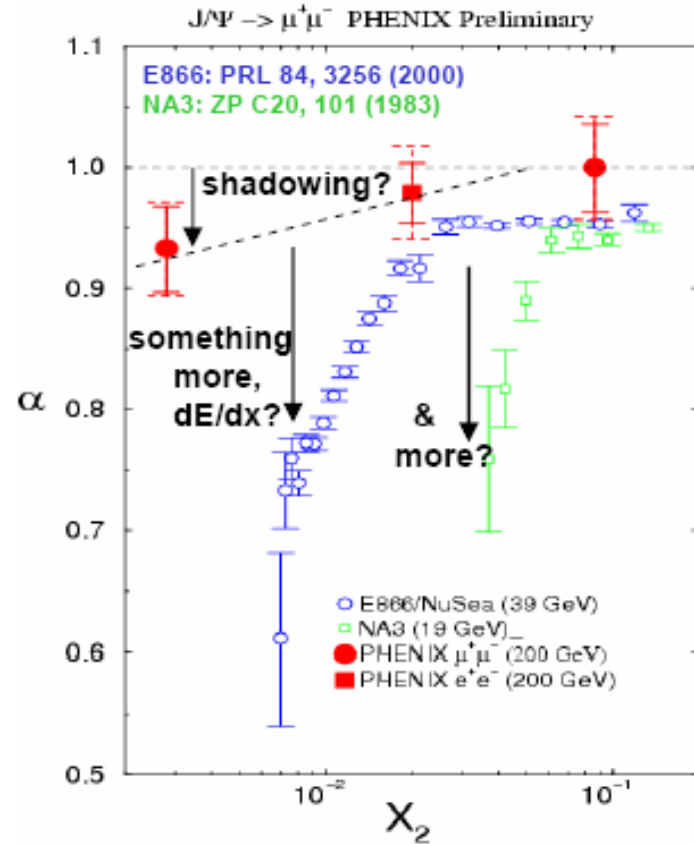
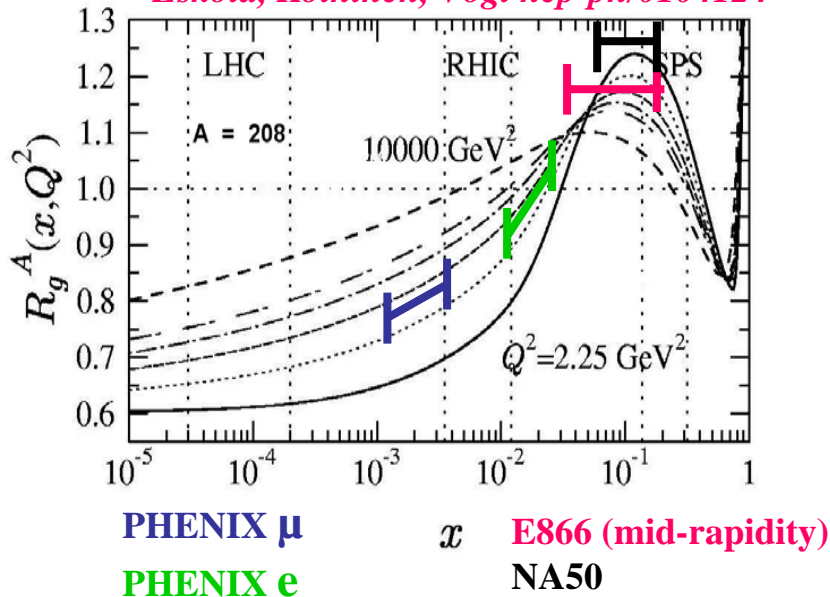
- J/Ψ and Ψ' similar at large x_F where they both correspond to a $c\bar{c}$ traversing the nucleus
- but Ψ' absorbed more strongly than J/Ψ near mid-rapidity ($x_F \sim 0$) where the resonances are beginning to be hadronized in nucleus
- open charm not suppressed at $x_F \sim 0$; what about at higher x_F ?



Large suppression at high x_F not explained by absorption

Suppression due to shadowing?

Eskola, Kolhinen, Vogt hep-ph/0104124



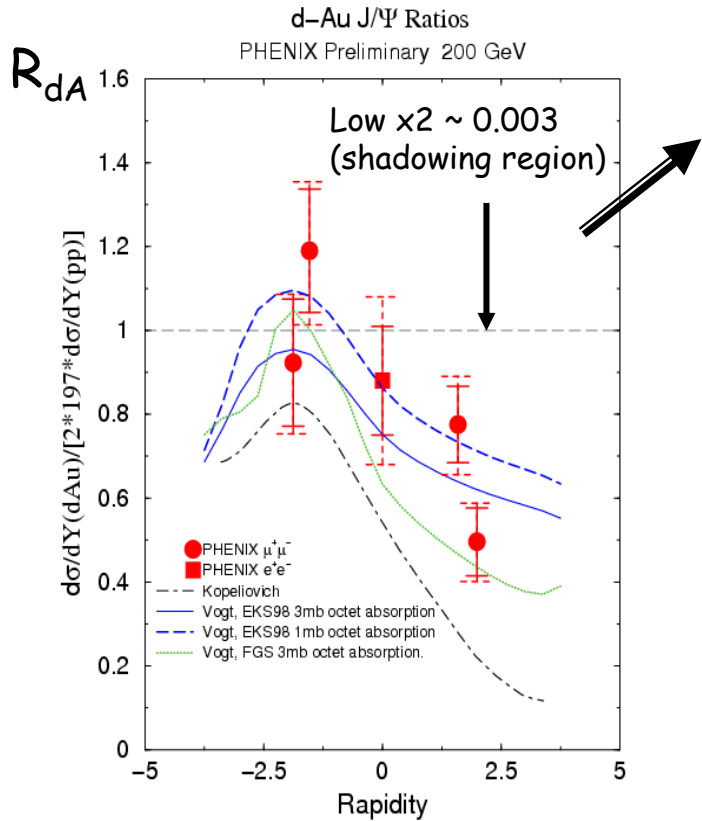
Lack of scaling in x_2 will also prevent shadowing from explaining the majority of the suppression in x_F

- Yellow report:

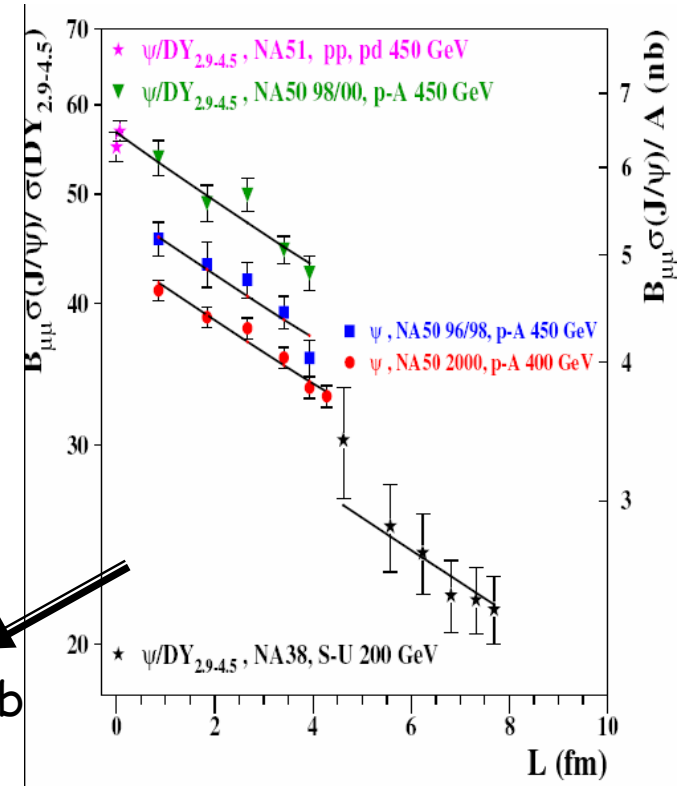
point de départ $\sigma_{abs}=5\text{mb}$ au SPS

→ $\sigma_{abs}=6.8\text{mb}$ à RHIC

et $\sigma_{abs}=10.3\text{mb}$ au LHC



$\sigma_{abs} \sim 1mb$



$\sigma_{abs} \sim 4,3 \pm 0,3 \text{ mb}$

Klein, Vogt, PRL 91:142301, 2003
Kopeliovich, NP A696:669, 2001

×4 différence entre
PHENIX @ 200 GeV et NA50 @ 29 GeV ?

Questions

- Qu'est-ce que $\sigma_{\text{abs}}^{J/\psi}$?
 - Une quantité effective
 - Qu'est-ce qui traverse le noyau et quelle est son évolution?
un état résonant $c\bar{c}$ ou une résonance complètement formée ?
 - Mesure-t-on les J/ψ primaires ?
feed-down du ψ' et du χ_c
- Absorption par les comovers quand on monte en énergie?
- Absorption/shadowing dans quel domaine cinématique?