Two Different Forms of Spatial Dependence Assumed

1) Follow Nuclear Matter Distribution:

$$S^i_{WS} = S^i(A,x,Q^2,\vec{r},z) = 1 + N_{WS}\,\frac{S^i(A,x,Q^2)-1}{1+\exp((s-R_A)/d)}$$

$$= 1 + N_{WS}\,(S^i(A,x,Q^2)-1)\,\rho(s)/\rho_0$$

$$N_{WS} = 1.317$$

2) Proportional to Nuclear Thickness at Collision Point

$$S^i_R = \begin{cases} 1 + N_R\,(S^i(A,x,Q^2)-1)\sqrt{1-(r/R_A)^2} & r \leq R_A \\ 1 & r > R_A \end{cases}$$

$$N_R = 1.449$$

Requirements

1) less effective shadowing at low density

$$S^i(A,x,Q^2,\vec{r},z) \to 1 \quad \text{as} \quad s \to \infty$$

2) recover DIS results

$$\frac{1}{A}\int d^2r\, dz\, \rho(s)\, S^i(A,x,Q^2,\vec{r},z) = S^i(A,x,Q^2)$$

Consequence: $s \to 0$ $\quad S^i_{WS,R} < S^i$ in shadowing + EMC regions

$S^i_{WS,R} > S^i$ in antishadowing region