Signatures for pQCD

☞ Energy Dependence of Elastic Cross Sections

$\Longrightarrow$ Exchange of the phenomenological Pomeron

$$\frac{d\sigma}{d|t|} \propto e^{-b_0|t|}\left(\frac{s}{s_0}\right)^{2(\alpha_{I\!P}(t)-1)}$$

$$\left.\frac{d\sigma}{d|t|}\right|_{t=0} \propto \left(\frac{s}{s_0}\right)^{2(\alpha_{I\!P}(0)-1)} \propto W^{4\epsilon} = W^{0.32}$$

$\Longrightarrow$ Exchange of a gluon ladder

$$\left.\frac{\mathrm{d}\sigma_{\gamma^* \mathrm{p}\to \mathrm{Vp}}}{\mathrm{d}|t|}\right|_{t=0} = A_{\mathrm{V}}\frac{\alpha_s^2(\bar{Q}^2)}{\alpha\bar{Q}^6}\left|\left[1+\frac{\mathrm{i}\pi}{2}\frac{\mathrm{d}}{\mathrm{d}(\ln x)}\right]xG(x,\bar{Q}^2)\right|^2$$

Energy dependence determined by $G(x,Q^2)$, $x \approx Q^2/W^2$

☞ Pointlike couplings; small-size $q\bar{q}$ configurations

$$\frac{d\sigma}{d|t|} \propto e^{-b|t|} \quad b = b_0 + 2\,\alpha'_{I\!P} \ln\frac{s}{s_0}$$

$$|t|_{min} = m_p^2\frac{(M_V^2+Q^2)^2}{W^4}$$

$\Longrightarrow$ $b \propto R_{\mathrm{p}}^2 + R_{\mathrm{VM}}^2$ (Elastic)

$\Longrightarrow$ Only longitudinally polarized configurations pointlike !!

☞ Absence of ρ^0 mass spectrum skewing

Skewing is interesting ($\sigma_{\pi p}^{tot}$?), but not pQCD

☞ Absence of shrinkage