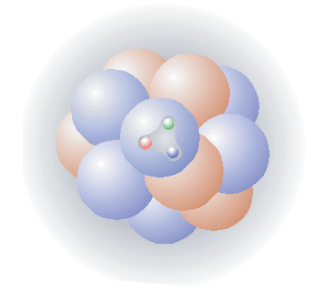


Quark Initial State Interaction



Quarks in the nucleon are driven **off-shell** by their **interaction**.

Our **goal** is to find a hard scattering observable, sensitive to the quark off-shellness and to extract the value of quark width from the experimental data.

ISI effects in inclusive DIS cross section, double (over the mass M_{DY} and the Feynman variable x_F of produced pair) and triple (p_T -distribution) differential cross sections of the Drell-Yan process are calculated.

The **method** of generalized factorization is used:

$$d\sigma = f(Q^2, p_T, \xi) \otimes d\hat{\sigma}(\xi, m) \otimes Sp(m, \Gamma),$$

$d\hat{\sigma}(\xi, m)$ - off-shell partonic cross section, $Sp(m, \Gamma)$ - quark spectral function, $f(Q^2, p_T, \xi)$ - unintegrated quark distributions.

Model assumption: $f(Q^2, p_T, \xi) = f(p_T)q(Q^2, \xi)$, where $f(p_T)$ - Gaussian, $q(Q^2, \xi)$ - conventional parton distribution functions.

Full off-shell kinematics is taken into account as well.

SUMMARY:

Quark initial state interaction effects in DIS and the Drell-Yan process are calculated.

The transverse momentum distribution of produced lepton pair in the Drell-Yan process is found to be very sensitive to initial quark off-shellness as well as to the quark's primordial transverse momentum.

The quark width in proton is estimated by comparing the calculations with the experimental data from NuSea collaboration.

