Abstract

We propose an experiment for investigation of color transparency effects in nuclei by studying two-body break-up reactions at sufficiently large values of transverse momenta of the recoil nuclear system. Particularly we are interested in studies of the D(e,e'p)n, ^{3}He(e,e'p)d and ^{4}He(e,e'p)^{3}H reactions at Q^2 =1 to 7 $(GeV/c)^2$ range in transverse kinematics with recoil momenta $\geq 200\ MeV/c$.

The theoretical studies of the different groups demonstrate that the cross section of these reactions in these kinematics are dominated mainly by final state interaction (FSI) of knocked-out nucleon with the residual nuclear system. The measurement of this FSI at $Q^2 = 1$ to 7 $(GeV/c)^2$ range will allow to study the probability for the nucleon, struck by the electron, *to reinteract* at small internucleon distances of about 1 fm. As a result the expansion effect which most probably masks the color transparency effect in the A(e,e'p)X reactions will be significantly suppressed. This approach is complementary to more traditional studies of color transparency which have been focused on measuring the probability for the struck nucleon *not to interact*.

The appropriate observable in two-body break-up reactions would be the ratio of the cross sections defined in the kinematics dominated by FSI to the cross section of the same reactions measured at the kinematics dominated by Glauber screening effects. Conventional calculation predicts largely Q^2 independent ratio while the onset of color transparency results in the decrease of this ratio with increase of Q^2. The theoretical models of color transparency which agree with the recent data on transparency from A(e,e'p)X reactions predicts much larger effects in two-body break-up reactions which the proposed experiment should be able to detect. This proposed study will be able to answer the question whether the lack of the color transparency in A(e,e'p) reactions observed up to $Q^2 = 8$ $(GeV/c)^2$ is related to the large expansion effect or to the fact that no small size configurations are produced at these values of Q^2.