International Nuclear Physics Conference INPC2013: 2-7 June 2013, Firenze, Italy

Mass dependence of short-range correlations in nuclei and the EMC effect

W. Cosyn[1], M. Vanhalst[1], C. Colle[1], J. Ryckebusch[1]

[1] *Department of Physics and Astronomy, Ghent University, Proeftuinstraat 86, B9000 Ghent, Belgium*

Contact email: *wim.cosyn@ugent.be*

An approximate method to quantify the mass dependence of the number of two-nucleon (2N) and three-nucleon (3N) short-range correlations (SRC) in nuclei is suggested. The proposed method relies on the concept of the "local nuclear character" of the SRC. We quantify the SRC by computing the number of independent-particle model (IPM) nucleon pairs and triples which reveal beyond-mean-field behavior. It is argued that those can be identified by counting the number of nucleon pairs and triples in a zero relative orbital momentum state [1,2]. We find that the relative probability per nucleon for 2N SRC follows a power law as a function of the mass number A. The predictions are connected to measurements which provide access to the mass dependence of SRC. First, the ratio of the inclusive inelastic electron scattering cross sections of nuclei to ^{2}H at large values of the Bjorken variable. Corrections stemming from the center-of-mass motion of the pairs are estimated. Second, the EMC effect, for which we find a linear relationship between its magnitude and the predicted number of SRC-prone pairs. Third, the width of the center of mass momentum distribution in double proton knockout from nuclei. We show that SRC pairs can be tagged by this width. The influence of final-state interactions on the width is studied.

[1] M. Vanhalst, J. Ryckebusch, W. Cosyn, Physical Review C 86 (2012), 044619;
[2] M. Vanhalst, W. Cosyn, J. Ryckebusch, Physical Review C 84 (2011), 031302(R).