Neutron Spin Structure in the Resonance Region and Quark-Hadron Duality

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The quark-hadron duality has been experimentally demonstrated for spin-independent structure functions. Duality is observed when the smooth scaling curve at high momentum transfer is an average over the resonance bumps at lower momentum transfer, but at the same value of scaling variable x. A detailed study of quark-hadron duality in spin-independent vs. spin-dependent structure functions and proton vs. neutron structure functions may expose the patterns in the spin-flavor dependence of the strong interaction.

Until recently, quark-hadron duality was not tested for spin structure functions due to the lack of precision spin structure data in the resonance region. Jefferson Lab experiment 01-012 used the polarized ^{3}He target in Hall A for a precision extraction of the neutron spin structure function g_1^n and the virtual photon asymmetry A_1^n in the resonance region up to Q^2 = 4(GeV/c)^2. Data from this experiment, combined with the proton resonance region spin structure function data from HERMES and Jefferson Lab halls B and C provide the first precision test of spin and flavor dependence of quark-hadron duality. Results from E01-012 will be presented.