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Update on the Jefferson Lab Hall A Tritium Experiments

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A large body of evidence suggests isospin symmetry plays a key role in the EMC effect, the modification of quark distribution functions in the nuclear medium, as well as short-range correlated pairing between nucleons. Electron scattering experiments that probe the momentum distributions of quarks or of nucleons are limited to nuclei near the valley of stability, in a narrow band of proton-neutron asymmetry, making it difficult to learn about how this asymmetry affects the nuclear environment. Tritium and helium-3, being highly asymmetric isospin-mirror nuclei, present a special opportunity; by comparing electron scattering from tritium and helium-3, as well as from deuterium, isospin symmetry can be exploited to disentangle the u- and d-quark EMC effects and the isospin dependence of short-range correlations. This past spring, a first round of experiments were completed at Jefferson Lab's Hall A using sealed-cell tritium and helium-3 targets, in order to look at electron scattering in deep-inelastic and quasi-elastic kinematics. These experiments will offer a one-of-a-kind look at the isospin dependence of the nuclear medium. In this talk, an overview of the three recent Hall A experiments and their physics goals will be presented.

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