

Probing the EMC effect thru the measurement of super-fast quarks in nuclei

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The microscopic origin of the EMC effect remains a mystery, with new observables proposed in recent years to elucidate its origin including measurements of the spin and flavor dependence of the EMC effect, the A dependence in light nuclei, and tagged measurements of DIS in the deuteron. A new possibility, enabled by a JLab energy upgrade, would maintain the clean interpretation of the inclusive measurements while providing unique sensitivity to several classes of models.

Extracting nuclear pdfs at $x > 1$ requires much higher energy, but allows the extraction of the super-fast quarks (the highest- x quarks in very high momentum nucleons). In this region, the pdfs fall very rapidly in a simple convolution model, providing dramatically enhanced sensitivity to models of the EMC effect that provide additional non-nucleonic contributions at large x or to explanations that are connected to off-shell effects in the high-momentum nucleons.

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