PHYSICS SEMINAR

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Short-Range-Correlations with BAND and Beyond

Abstract

Protons and neutrons, or also known as nucleons, are bound together to make the nuclei of all atoms. The usual and simple picture of this binding is an "effective" interaction of one nucleon with all the surrounding nucleons. This picture is highly successful to describe most scattering experiments where a projectile is scattered by a nucleus to reveal its inner structure. However, several experiments in the past showed that the simple effective interaction is not the full picture. Indeed, some of the nucleons like to be paired together for a short time at a short range. We are calling these pairs "Short Range Correlations" (SRC) and they have been intensively investigated by experiments in the past 20 years. Short range correlations play a non-negligible role in how nucleons are bound in nuclei.

In my talk, I will present our current picture of nuclei and the SRC pairs within with focus on the tagged deep inelastic scattering measurements on deuterium in HallB. For the measurement in HallB, a new detector, BAND, has been build for the measurement of backward going neutrons under my supervision. I will highlight the commissioning and performance of this detector. Tagged measurements are also a great avenue at the future Electron-Ion collider and I will show what we can do there to study SRCs.

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