

Short-Range Correlations in Nuclei

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The nuclear shell model pictures deeply bound nucleons as being in fully occupied states. At and above the Fermi surface, configuration mixing then leads to occupancies that gradually decrease to zero. This picture is modified in an important way by several correlation effects that are absent from, or are described only approximately by, effective-interaction theories, such as the shell model. These correlations arise from short-range, soft-core, and tensor nucleon-nucleon interactions and from longer-range couplings involving low-lying and giant resonance collective excitations. Over the years, a variety of experimental studies using different probes, including a set of complementary nuclear reactions, have been interpreted to reveal signatures of such correlation effects, including short-range correlations. The availability of rare-isotope beams has allowed expanding such explorations towards the extremes of isospin. This presentation will summarize the present status, challenges, and open questions.

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