

Abstract
References

Nuclear Physics A

Volume 480, Issues 3–4, 11–18 April 1988, Pages 469–489



The swelling of nucleons and quark antisymmetrization

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Abstract

Antisymmetrization of the nuclear wavefunction at the quark level implies that quarks belonging to different nucleons are exchanged in proportion to the degree of nucleon overlap. This leads to an additional contribution to the quark-quark correlation beyond that expected in a conventional picture. We first explore this in a simple solvable one-dimensional model. Subsequently an extension is made to a model of nuclear matter for which divergences are encountered in the limit of large N . These are traced to the existence of unlinked quark clusters. After renormalization, the quark-quark correlation is computed. It is concluded that quark antisymmetrization leads to an effective nucleon size which depends on the nuclear density. A simple analytic formula for the effective nucleon radius is obtained.

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