

The isospin splitting of the effective Dirac mass and symmetry energy in asymmetric nuclear matter (ANM) from the relativistic *ab-initio* calculation

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Purpose Study properties of asymmetric nuclear matter (ANM) with the relativistic Brueckner-Hartree-Fock (RBHF) theory **in the full Dirac space**.

Outline The RBHF theory in the full Dirac space is developed and applied for ANM.

Result The long-standing controversy about the isospin splitting of the effective Dirac mass in *ab-initio* calculations of ANM is clarified (see right figure). The symmetry energy and its slope parameter are $E_{\text{sym}}(\rho_0) = 33.1 \text{ MeV}$ and $L = 65.2 \text{ MeV}$, in agreement with empirical values.

Computing system: OCTOPUS
memory used: 0.9 GB
parallelize: 1 node
node-hour: 6.3 octopus point

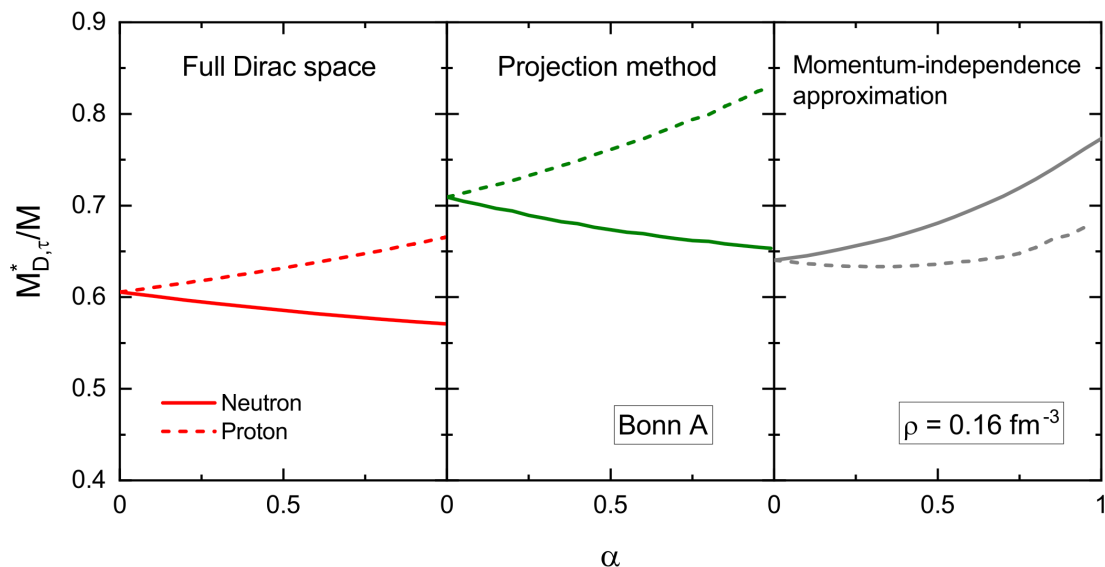


Figure. The effective Dirac mass for the neutron and proton as functions of the asymmetry parameter α calculated by the RBHF theory in the full Dirac space, in comparison with the results obtained by the RBHF calculations using the projection method and the momentum-independence approximation.

WSB, H. Tong, Q. Zhao, C. Wang, P. Ring, and J. Meng,
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