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Neutron star and β-stable EOS with Brown-Rho scaled low-momentum NN interactions HUAN DONG, THOMAS KUO, Stony Brook University, RUPRECHT MACHLEIDT, University of Idaho — Neutron star properties, such as its mass, radius, and moment of inertia, are calculated by solving the Tolman-Oppenheimer-Volkov equations using the ring-diagram equation of state (EOS) obtained from realistic low-momentum NN interactions V_{low-k}. Several NN potential models (CDBonn, Argonne, Nijmegen) have been employed to calculate the ring-diagram EOS where pphh ring diagrams are summed to all orders. The proton fraction for a β-stable neutron star is determined from the chemical potential condition $\mu_n - \mu_p = \mu_e$. The neutron star masses and radii given by the above potentials alone both tend to be about 30% too small compared with accepted values. Our results are largely improved with the inclusion of medium corrections based on Brown-Rho scaling where the in-medium meson masses, particulaly those of ω, ρ and σ, are slightly decreased compared with their in-vacumn values. Initial results using such medium corrected V_{low-k} are neutron star mass $M \sim 1.6 M_{sun}$ and radius $R \sim 8$ km. Effects from superconducting neutron EOS are discussed.

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