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The EOS properties of asymmetric nuclear matter with the effect of the three-body force

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The Brueckner-Hartree-Fock (BHF) approximation for the two-body forces fails to reproduce "correctly" the empirical saturation point of the symmetric nuclear matter ($\rho o = 0.625$ fm^{-3}) for the Argonne V18 potential and ($\rho o = 0.33$ fm^{t}) for the BoonB potential. In the present work one may introduce a Skyrme effective introduction density dependent term in addition to the BHF calculations to obtain the correction parameters for Three-Body Force (TBF). The three-body effects are studied for both asymmetric nuclear matter and pure neutron matter to calculate the nuclear Equation Of State (EOS). The TBF contribution to the EOS of the nuclear matter is repulsive within the BHF framework. The introduction of the TBF shifts and improves the saturation properties of the nuclear matter ($\rho o = 0.2$ fm^{-3}, Eo/A = -15.27 MeV) for the Argonne potential and ($\rho o = 0.17$ fm^{-3}, Eo/A = -17 MeV) for the BonnB potential towards to the empirical saturation point. The incompressibility at the saturation densities for the two different potentials is studied and it's found 246.97 MeV for the Argonne potential and 216.7 MeV for the BonnB potential comparing with the experimental value for the symmetric nuclear matter have been determined to be 240 ±20 MeV. The pressure as a function of the density in fm-3 for the symmetric nuclear matter is calculated, negative values for the pressure at densities below the saturation density are obtained, the pressure starts to increase as the increasing of the density up to zero value at the saturation density.

Biography

Mohamed El-Zohry has completed his PhD from Yerevan State University and and is now a Lecturer of Physics at the Physics Department of Sohag University. He has published more than 15 papers in different international reputed journals.

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