

# Thermodynamical Properties of Asymmetrical Nuclear Matter

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The isothermal equation of state of hot asymmetric nuclear matter with the the new charge dependent Reid potential (Reid93) up to  $J = 9$  channels within the lowest order constrained variational method (LOCV) is calculated for wide range of densities and proton to neutron ratio and also temperatures up to  $KT = 30MeV$ .

The temperature dependence of symmetry energy and validity of  $\alpha^2$  law are discussed. The liquid-gas phase transition, as well as the critical behavior of equation of state is discussed. A critical temperature of about  $27MeV$  and critical exponent of 0.38 for symmetric case is found. We find that there is no liquid-gas phase transition for ratio less than  $R(\frac{\rho_p}{\rho_n}) = 0.15$ . Other thermodynamical quantities such as pressure, entropy, specific heat and etc. are calculated. The results are compared with recent calculations which have been obtained by using other methods and potentials.