

## The Influence of the Renormalization Condition to the Equation of State of the Nuclear Matter

CHEN Wei, AI Bao-Quan, ZHENG Xiao-Ping and LIU Liang-Gang

Department of Physics, Zhongshan University, Guangzhou 510275, China  
(Received: 2000-6-20; Revised: )

Abstract: In the relativistic  $\sigma$ - $\omega$  model, the influences of the parameters  $b$ ,  $c$ ,  $d$  in the potential  $U(\sigma)=(1/2!)b\sigma^2+(1/3!)c\sigma^3+(1/4!)d\sigma^4$  to the incompressibility, effective mass and binding energy of the nuclear matter are studied in detail. The calculation of equation of state of nuclear matter shows that the values of  $b$ ,  $c$ ,  $d$  depend on the renormalization condition, we also find that a soft equation of state of nuclear matter can be obtained in a suitable renormalization condition, and the experimental incompressibility coefficient can be reproduced. These results are also used to study the thermal properties of hot  $\Delta$ -resonant nuclear matter.

PACS: 21.65.+f, 11.10.Gh, 24.10.Cn, 24.10.Jv

Key words: equation of state, self-interaction of  $\sigma$  meson, renormalization, hot and dense hadronic matter

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