Effect of Mesons $f_0(975)$ and $\phi(1020)$ and Variety of $U_\Xi^{(N)}$ on Properties of Neutron Star Matter

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Abstract: We examine the effect of adding mesons $f_0(975)$ and $\phi(1020)$ as well as the variety of $U_\Xi^{(N)}$ (the potential well depth of Ξ in nuclear matter) from -10 MeV to -28 MeV on the extent of the particles participation and the properties of the neutron star in the relativistic mean field model. We find that considering the contribution of f_0 and ϕ mesons, the equation of state of the neutron star turns soft, the maximum mass reduces while the corresponding radius increases. Ξ^- hyperons appear at lower density as $U_\Xi^{(N)}$ becomes deeper, and the variety of $U_\Xi^{(N)}$ has little effect on the equation of state and the properties of the neutron star.

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