Equation of State of Protoneutron Star with Trapped Neutrinos

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Abstract: The influence of trapped neutrinos on the proto-neutron star is studied in the framework of relativistic mean-field theory. The results show that trapped neutrinos increase proton fraction and make the equation of ∞ state of neutron star matter softer when neglecting hyperonic freedom, while suppress the appearance of hyperons and make the equation of state stiffer when including hyperons in the protoneutron star. The maximum mass, compared with cold neutron star which is in beta equilibrium, decreases by $0.06_{M_{\odot}}$ for non-strange protoneutron star while increases by $0.21_{M_{\odot}}$ for protoneutron star with hyperons when the relative number of trapped neutrino is 0.4.

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