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Condensation of tetraneutron in neutron stars

Based on recent experimental and theoretical hints on possible formation of a resonant four-neutron system we study effects of appearance of such a cluster in neutron rich baryon matter inside NSs. For this purpose we employ a relativistic mean field approach which includes nucleons, Δ-baryons as well as light nuclear clusters. Our analysis demonstrates that tetraneutrons existing as the Bose-Einstein condensate can affect the equation of state of cold baryonic matter and observable characteristics of neutrons stars. Tetraneutron driven suppression of Δ-baryons is another important result of our study. Influence of tetraneutrons on formation of superconducting phase is also discussed.

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