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Thermodynamics of the three flavor PNJL0 model

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The effective quark model Polyakov-Nambu-Jona-Lasinio (PNJL) incorporates the effect of confinement/deconfinement on the original Nambu-Jona-Lasinio model (NJL) by inserting the Polyakov Loop (Φ) on the equations of states~(EOS) at finite temperature. However, at zero temperature regime, the PNJL loses all contributions of Φ and the EOS returned for the same as original NJL equations on $T = 0$. In this work, we present the SU(3) PNJL model at zero temperature, called SU(3) PNJL0. The model is based on the modification of coupling constants, by making them dependents of Φ and adding a dependent term of Φ in the grand canonical potential, limiting the loop in $0 \leq \Phi \leq 1$ and favors nonvanishing Φ solutions. We impose that in the free quarks regime(deconfinement) all interactions vanish. We investigate how are the first order phases transitions and how the strange quark favors the restoration of chiral symmetry. Another point discussed is how the constants G_V and a_3 (parameter of Polyakov potential) affect the quarkyonic phase on this model.

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