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Modeling the mass of color-flavor locked strange quark stars

In the search for the true ground state of dense matter at sufficiently large densities and low temperatures, in the following we model the mass of color-flavor locked strange quark stars. We address then feasibility conditions for the realization of the phase diagram of dense nuclear matter, as a function of the baryonic chemical potential, μ_B , and the temperature T (plane $\mu_B - T$), in the quark stars regime $T \sim 0$, $\mu_B \sim M_n$, where M_n represents the mass of the nucleon. Given observational and theoretical uncertainties in the determination of the phase diagram of superdense matter, in our study we focus our attention on consistent parameterizations of the quark matter density ρ, the superconducting band gap Δ and the strange quark mass m_s in order to matche observational mass predictions. Our results are in accordance with observational expectations for massive compact stars, and may even exceed in some cases 2.0 solar masses.

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