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Quarkyonic matter with chiral symmetry restoration

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We present a novel unified approach to describe the dense symmetric nuclear matter by combining the quarkyonic matter framework with the parity doublet model. This integration allows for a consistent treatment of the transition from hadronic to quark degrees of freedom while incorporating chiral symmetry restoration effects. Our model introduces a chiral invariant mass for both baryons and constituent quarks, enabling a smooth

crossover between hadronic and quark matter in symmetric nuclear matter. We derive the equation of state (EOS) for this hybrid system and investigate its thermodynamic properties. The model predicts a gradual onset

of quark degrees of freedom at high densities while maintaining aspects of confinement.

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