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The Deconfinement Phase Transition in Proto-Neutron-Star Matter JACOB ROARK, Kent State Univ - Kent — Neutron stars have masses between 1.4 and 3 $M_{\odot}$, all packed into a sphere just 12 to 13 km across (roughly the size of Manhattan). Consequently, neutron stars exhibit some the of highest material densities in the universe, averaging around 7×10^{17} kg/m^3, over three times the density of an atomic nucleus. Under such astronomical pressures, some very interesting, novel states of matter can be achieved, such as quark matter, in which hadrons effectively dissolve and quark deconfinement occurs. In this work, we study in detail the deconfinement phase transition that takes place in hot/dense nuclear matter in the context of neutron stars and proto-neutron stars (in which lepton fraction is fixed). The possibility of different mixtures of phases with different locally and globally conserved quantities is considered in each case. For this purpose, the Chiral Mean Field (CMF) model, an effective relativistic model that includes self-consistent chiral symmetry restoration and deconfinement to quark matter, is employed. Finally, we compare our results with data provided by PQCD for different temperatures and conditions.

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