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Modelling of the hybrid stars within the Polyakov Loop coupled Nambu-Jona-Lasinio model

We present a thorough analysis of the properties of the hybrid stars based on a recently developed version the Polyakov Loop coupled Nambu-Jona-Lasinio model of quark phase that maintains the Polyakov loop dynamics in the limit of zero temperature. First, we demonstrate that incorporation of the Polyakov loop to the model significantly stiffens the quark matter equation of state, which is important for phenomenology of hybrid stars. For the hadron phase we consider a couple of realistic nucleonic equation of state. Furthermore, to construct the quark-hadron transition we utilize the Maxwell and Glendenning scenarios. We also show how the strength and the type of the transition between hadron and quark phases affect observational properties of the star and as well as tidal deformability parameters.

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