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## Some new aspects of the QCD phase transition in proto-neutron stars and core-collapse supernovae

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Recently it was shown that a phase transition to deconfined quark matter can lead to the formation of a novel kind of third family of compact stars, that is present only in the hot, early stages of their evolution. Such a feature can be related to unusual thermal properties of the equation of state in the phase coexistence region, which manifest themselves as a negative slope of the phase transition line in the pressure-temperature phase diagram. A third family is interesting for core-collapse supernovae, as a collapse from the second to the third branch could trigger an explosion, as indicated in previous works. In addition, the unusual thermal properties could lead to a special, inverted form of convection in proto-neutron stars.

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