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Solving reconfinement, masquerade and hyperon puzzles of compact star interiors

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We aim at clarifying three of the fundamental puzzles related to the still unsolved problem of the structure of the dense core of compact stars (CS): (i) hyperon puzzle: how to reconcile pulsar masses of $2M_{\odot}$ with the hyperon softening of the equation of state (EoS); (ii) masquerade problem: modern EoS for cold, high density hadronic and quark matter are almost identical; and (iii) reconfinement puzzle: what to do when after a deconfinement transition the hadronic EoS becomes favorable again?

We show that taking into account the compositeness of baryons (by excluded volume and/or quark Pauli blocking) on the hadronic side and confining and stiffening effects on the quark matter side results in an early phase transition to quark matter with sufficient stiffening at high densities which removes all three present-day puzzles of CS interiors.

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