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Exploring axial U (1) restoration in a modified 2+1 flavor Polyakov quark meson model Suraj Kumar Rai a,* , Vivek Kumar Tiwari a а Department of Physics, University of Allahabad, Prayagraj, India, 211002. E-mail: surajrai050@gmail.com, vivekkrt@gmail.com Topic(s): Strongly-interacting matter at finite temperature Abstract: We report on the U A (1) symmetry restoration resulting due to temperature dependence of the coefficient c(T) for the Kobayashi-Maskawa-'t Hooft determinant (KMT) term in a modified 2+1 flavor Polyakov loop quark meson model having fermionic vacuum correction term (PQMVT). Temperature dependence of KMT coupling c(T) drives the non-strange condensate melting to significantly smaller temperatures in comparison to the constant c case. Further due to c(T), m η 0 decreases from its vacuum value by 220 MeV near T=176 MeV after the chiral transition (T c χ = 154.9 MeV). This is similar to the η 0 in-medium mass drop of at least 200 MeV as reported by Csorgo and Vertesi in Ref [Csorgo, Vertesi], as an experimental signature of the effective restoration of U A (1) symmetry. The pseudoscalar mixing angle θ p achieves antiideal mixing in the influence of c(T). The η meson becomes light quark system (η N S) at T=176 MeV and changes its identity with η 0 meson which becomes strange quark system (η S). The degenerated temperature variations of σ , π meson masses merges with the temperature variations of the masses of degenerated a 0, η mesons near 275 MeV. It means that for c(T) when m σ = 400 MeV, the U A (1) restoration takes place at 1.75 T c χ =275 MeV.

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