

# Finite Temperature in Quarkyonic matter: Challenges and difficulties.

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## Content

We introduce a theoretical framework to analyze the thermal properties of a recently proposed phenomenological model of quarkyonic matter. This entails proposing finite temperature distribution functions and entropy functionals constrained by internal theoretical consistency. We use the formalism developed here to analyze the effect of temperature on the quark onset as a function of baryon density. We find that any attempt to add finite temperature to toy models of quarkyonic matter presents major problems, as it is not possible to define an energy distribution from first principles. However, we can present general behaviors and also note that it may be possible to use these temperature distributions in a more robust model of quarkyonic matter, such as the one proposed in Physical Review D 104 (9), L091901.

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