Statistical Gauge Theory for Relativistic Finite Density Problems

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Abstract: A relativistic quantum field theory is presented for finite density problems based on the principle of locality. It is shown that, in addition to the conventional ones, a local approach to the relativistic quantum field theories at both zero and finite densities consistent with the violation of Bell-like inequalities should contain and provide solutions to at least three additional problems, namely, i) the statistical gauge invariance; ii) the dark components of the local observables; and iii) the fermion statistical blocking effects, based upon an asymptotic nonthermal ensemble. An application to models is presented to show the importance of the discussions.

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