## MAGIC23 Workshop (Matter, Astrophysics, Gravitation, Ions and Cosmology)



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## Renormalization group techniques applied to the thermodynamics of a derivatively interacting model

A recently developed variational resummation technique, incorporating renormalization group properties consistently, has been shown to solve the scale dependence problem that plagues the evaluation of thermodynamical quantities, e.g., within the framework of approximations such as in the hard-thermal-loop resummed perturbation theory. This method is used in the present work to evaluate thermodynamical quantities within the two-dimensional nonlinear sigma model, which, apart from providing a technically simpler testing ground, shares some common features with Yang-Mills theories, like asymptotic freedom, trace anomaly and the nonperturbative generation of a mass gap. The present application confirms that nonperturbative results can be readily generated solely by considering the lowest-order (quasi-particle) contribution to the thermodynamic effective potential, when this quantity is required to be renormalization group invariant.

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