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Volume Effect of Fisher zeros in the Nonlinear sigma model HAIYUAN ZOU, YANNICK MEURICE¹, University of Iowa — In lattice gauge theory, finite size scaling is an important tool to understand finite volume effects and to discriminate among different types of phase transitions. We discuss related issues for 2-dimensional O(N) sigma models in the large-N limit. These models have features similar to 4-dimensional SU(2) and SU(3) gauge theories (asymptotic freedom, mass gap, absence of phase transition at real coupling). We discuss the gap equation at finite volume for complex values of the't Hooft coupling. We show that the singular points of this equation correspond to the end of lines of complex zeros of the partition function. We discuss the scaling of the density of zeros with N and the volume. We briefly discuss the implications of these results for gauge theories.

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