Phase coexistence in the $O(N) \oplus O(M)$ nonlinear sigma model: a conformal bootstrap study

CHRIS HOOLEY, SAM RIDGWAY, University of St Andrews, U.K. — The low-temperature physics of systems with competing orders is a ubiquitous topic in modern condensed matter physics. A commonly studied field theory of such systems is the $O(N) \oplus O(M)$ nonlinear sigma model: an $O(N + M)$ model with a mass term attached to $N$ of the field components. Depending on the sign of the mass term, order in the $O(N)$ sector or the $O(M)$ sector is favored. However, the physics near the high-symmetry point is subtle, and in some cases (e.g. $N = M = 2$) it remains unclear whether there is a first-order spin-flop transition or a finite-width microscopic coexistence phase. In this talk, we present an analysis of the $O(N) \oplus O(M)$ model based on the conformal bootstrap method. This allows us to classify the critical points of the models in question, and by extension determine whether a coexistence phase exists or not.

Chris Hooley
University of St Andrews

Date submitted: 06 Nov 2015

Electronic form version 1.4