**Phase coexistence in the O($N$)⊕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($N$)⊕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($N$)⊕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.

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