Contribution Title:	GRADIENT MODELS WITH NON-CONVEX INTERACTIONS
Authors:	S. Adams, R. Kotecky, S. Mueller
Presenting author:	Adams S.
Affilation:	University of Warwick
E-mail:	S.Adams@warwick.ac.uk
Invited speaker:	Topical session
YRS seminar:	NO

Recently the study of gradient fields has attained a lot of attention because they are space-time analogy of Brownian motions, and are connected to the Schramm-Loewner evolution. The corresponding discrete versions arise in equilibrium statistical mechanics, e.g., as approximations of critical systems and as effective interface models. The latter models - seen as gradient fields - enable one to study effective descriptions of phase coexistence.

In the probabilistic setting gradient models involve the study of strongly correlated random variables. One major problem has been open for several decades. What can be proved for the free energy and the Gibbs states for non-convex interactions given a non-vanishing tilt at the boundary? We present in the talk the first break through for low temperatures using Gaussian measures and rigorous renormalization group techniques yielding an analysis in terms of dynamical systems. The key ingredient is a finite range decomposition for parameter dependent families of Gaussian measures. We outline the connection to the Cauchy-Born rule which states that the deformation at the atomistic level is locally given by an affine deformation at the boundary. (Joint work with R. Kotecky and S. Mueller).