

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Sheared Ising models in three dimensions¹ ALFRED HUCHT, SEBASTIAN ANGST, Faculty of Physics, University of Duisburg-Essen, 47048 Duisburg, Germany — The nonequilibrium phase transition in sheared three-dimensional Ising models is investigated using Monte Carlo simulations in two different geometries corresponding to different shear normals [A. Hucht and S. Angst, EPL 100, 20003 (2012)]. We demonstrate that in the high shear limit both systems undergo a strongly anisotropic phase transition at exactly known critical temperatures T_c which depend on the direction of the shear normal. Using dimensional analysis, we determine the anisotropy exponent $\theta = 2$ as well as the correlation length exponents $\nu_{\parallel} = 1$ and $\nu_{\perp} = 1/2$. These results are verified by simulations, though considerable corrections to scaling are found. The correlation functions perpendicular to the shear direction can be calculated exactly and show Ornstein-Zernike behavior.

¹Supported by CAPES-DAAD through PROBRAL as well as by the German Research Society (DFG) through SFB 616 “Energy Dissipation at Surfaces.”

Alfred Hucht
Faculty of Physics, University of Duisburg-Essen, 47048 Duisburg, Germany

Date submitted: 10 Dec 2012

Electronic form version 1.4