Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Dynamical evidence for a domain pattern phase transition DAVID VENUS, NIDAL ABU-LIBDEH, McMaster University — Ultrathin 1.5ML Fe/ 2ML Ni/W(110) films have a perpendicular magnetic anisotropy, and form domain patterns, similar to many systems with attractive short-range and repulsive long-range interactions. Numerous microscopy studies have indicated that the domain pattern changes from an ordered stripe (smectic) phase to a positionally disordered (nematic or tetragonal) phase as the temperature is increased, and pattern defects proliferate. There is very little known about the dynamics of these phases. We study the domain dynamics on time scales of minutes to hours by quenching the films from high temperature (360 K), and measuring the ac magnetic susceptibility as the film is heated at a series of constant rates, from R=0.70 to 0.03 K/s. The entire susceptibility curve is observed to relax in temperature, with the peak temperature increasing as R decreases. This opposite to what is expected for relaxation of the smectic stripe density with temperature. A quantitative analysis is consistent instead with the relaxation of the pattern defects trapped by quenching as the domain pattern undergoes a transition to the low temperature stripe phase.

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Date submitted: 12 Nov 2009 Electronic form version 1.4