

Abstract Submitted
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Scaling in modulated systems and reentrance of order OLIVER PORTMANN, ALESSANDRO VINDIGNI, DANILO PESCIA, ETH Zurich — Ultrathin ferromagnetic iron films exhibit a peculiar reentrance of order.¹ A less symmetric pattern (stripes) that is present at lower temperatures reoccurs at higher temperatures after a more symmetric intermediate state (labyrinth). We obtain a good qualitative understanding of the system by analytically reducing this problem in two spatial dimensions to an effectively one-dimensional problem that retains important properties of the original system even in the presence of small deviations from mono-dimensionally modulated order. As revealed by a scaling analysis, this system is characterized by a highly anomalous temperature dependence of an elastic constant. This finding is corroborated by mean-field calculations. By means of the scaling analysis, we can relate this experimentally inaccessible elastic constant to experimentally measurable quantities. Comparison with experiment suggests that the driving force for the reentrance of order is indeed the strongly anomalous behavior of this elastic constant.

¹O. Portmann, A. Vaterlaus, and D. Pescia, *Nature* **422**, 701 (2003).

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