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Periodic striped configurations in the large volume limit

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Abstract. We show striped pattern formation in the large-volume limit for a class of generalized antiferromagnetic local/nonlocal interaction functionals in general dimension previously considered in [10, 12, 20] and in [14, 17] in the discrete setting. In such a model, the relative strength between the short-range attractive term favouring pure phases and the long-range repulsive term favouring oscillations is modulated by a parameter τ. For $\tau < 0$, the minimizers are trivial uniform states. It is conjectured that for all dimensions $d \geq 2$ there exists $0 < \bar{\tau} \ll 1$ such that for all $0 < \tau \leq \bar{\tau}$ and for all $L > 0$ minimizers on periodic boxes of size L are striped/lamellar patterns. In [10] we give a partial proof of the above conjecture for $L = 2kh^*_\tau$, where $k \in \mathbb{N}$ and h^*_τ is the optimal period of stripes for a given $0 < \tau \leq \bar{\tau}$. The purpose of this paper is to show the validity of the conjecture in its full generality, namely showing pattern formation in the large-volume limit on boxes of arbitrary size L.

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