[02/11/2015 - P058]

Langevin simulations of two dimensional systems with competing interactions, LUCAS NICOLAO, *UFSC*, ALEJANDRO MENDOZA-COTO, DANIEL STARIOLO, *UFRGS*, ROGELIO DIAZ-MENDEZ, *ISIS - France*

■We show some recent advances in simulations of coarse-grained models for systems where pattern formation is an equilibrium phenomena, as a consequence of underlying interactions competing on different ranges. These give rise to modulated (thermodynamic) phases composed of simple domain structures, such as stripes and bubbles in 2D. In the case of thin magnetic films, for example, the competition between the exchange (ferromagnetic) and dipolar (antiferromagnetic) interactions give rise to magnetic stripe domain phases in the absence of applied magnetic field, whereas in its presence bubble or uniform phases appear. While a stripe ground state possess both anisotropic translational and orientational orders, strong fluctuations due to the low dimensionality and continuous symmetry can stabilise a nematic phase, with orientational order alone. Our results give evidence that, depending on the range of the competing interaction, this phase can have quasi-long-range order (of the BKT universality class, in the case of a dipolar interaction) or a true long-range order (in the case of a Coulomb interaction). In the presence of an uniform external field, we show that for sufficiently weak competing interactions, there is a re-entrant behaviour of the uniform phase with respect to the modulated phases - for finite applied field, stripe and bubble phases can be found mainly for moderate temperatures.