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Mean Field aspects of magnetic domain pattern evolution in ultrathin Fe/Cu(001) films DANILO PESCIA, ALESSANDRO VINDIGNI, NICULIN SARATZ, OLIVER PORTMANN, Laboratory for Solid State Physics, ETH Zurich, PAOLO POLITI, Istituto dei Sistemi Complessi, CNR Firenze — Ultrathin Fe/Cu(001) films are magnetized out of plane and represent an experimental counterpart of the 2D Dipolar Frustrated Ising Ferromagnet. Indeed, one of the most attractive feature of these films is the occurrence of a variety of magnetic domain patterns; the last few consist of superstructures of positive and negative magnetization which originate from the competition between long-ranged antiferromagnetic dipolar interaction and nearest-neighbor ferromagnetic exchange interaction. The experimental patterns are relatively free to change their characteristic length of modulation as well as their overall structure (striped, labyrinthine, etc...) when the temperature is varied. The Mean Field theory is able to reproduce the temperature dependence of some important experimental observables like the domain width and the inside-domain magnetization profile (obtained by SEMPA images). We report on some Mean Field predictions for the 2D Dipolar Frustrated Ising Ferromagnet in close relationship with quantitative analysis of experimental SEMPA images recorded on Fe/Cu(001) films.

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