Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Stripe glasses in ferromagnetic thin films ALESSANDRO PRINCIPI, MIKHAIL KATSNELSON, Institute for Molecules and Materials, Radboud University — Domain walls in magnetic multilayered systems can exhibit a very complex and fascinating behavior. The magnetization of thin films of hard magnetic materials is in general perpendicular to the thin-film plane, but its direction changes periodically, forming an alternating spin-up and spin-down stripe pattern. The latter is stabilized by the competition between the ferromagnetic coupling and dipole-dipole interactions, and disappears when a moderate in-plane magnetic field is applied. It has been suggested that such a behavior may be understood in terms of a self-induced stripe glassiness. In this paper we show that such a scenario is compatible with the experimental findings. The strong out-of-plane magnetic anisotropy of the film is found to be beneficial for the formation of both the stripe-ordered and glassy phases. At zero magnetic field the system can form a glass only in a narrow interval of fairly large temperatures. An in-plane magnetic field, however, shifts the glass transition towards lower temperatures, therefore enabling it at or below room temperature. In good qualitative agreement with the experimental findings, we show that a moderate in-plane magnetic field of the order of 30 mT can lead to the formation of defects in the stripe pattern.

Alessandro Principi
Institute for Molecules and Materials, Radboud University

Date submitted: 06 Nov 2015 Electronic form version 1.4