

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Multilayers of Co and Pt: the ultrathin limit MICHALIS CHARILAOU, ETH Zurich, CATHERINE BORDEL, UC Berkeley, PIERRE-EMMANUEL BERCHE, Université de Rouen, BRIAN MARANVILLE, NIST, FRANCES HELLMAN, UC Berkeley — Magnetic properties of ultrathin (Co/Pt) multilayers, with overall composition 1Co:3Pt and a sub-monolayer Co coverage have been investigated to provide deeper understanding of magnetism in the ultrathin limit and to better understand the alloy. A comparison between a sub-monolayer multilayer and an fcc CoPt₃ alloy film with perpendicular magnetic anisotropy (PMA) attributed to growth-induced Co clustering reveals significant differences in magnetization, despite the presence of thin Co platelets in both cases. Two regimes of the ferromagnetic phase transition, Brillouin and non-Brillouin-like, are seen in the experimental $M(T)$ data and have been reproduced in Monte Carlo simulations, associated with different distributions of Co-Co nearest neighbors. Both the average number of Co-Co pairs and the width of the distribution are higher for the alloy than the multilayer, leading to surprisingly higher Curie temperature and a nearly linear temperature-dependence of the magnetization of the alloy film, in contrast to the Brillouin-like behavior of the multilayer.

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Date submitted: 13 Nov 2014

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