Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Modeling of UV laser-induced patterning of ultrathin Co films on bulk SiO2: verification of short- and long-range ordering mechanisms JUSTIN TRICE, Department of Physics, Washington University in St. Louis, MO 63130, CHRISTOPHER FAVAZZA, Department of Physics, Washington University in St. Louis, MO 63130, RAMKI KALYANARAMAN, Department of Physics, Washington University in St. Louis, MO 63130, R. SURESHKUMAR, Department of Chemical Engineering, Washington University in St. Louis, MO 63130, DEPARTMENT OF PHYSICS, WASHINGTON UNIVERSITY IN ST. LOUIS, MO 63130 TEAM, DEPARTMENT OF CHEMICAL ENGINEERING, WASHINGTON UNIVERSITY IN ST. LOUIS, MO 63130 COLLABORATION — Irradiating ultrathin Co films (1 to 10 nm) by a short-pulsed UV laser leads to pattern formation with both short- and long-range order (SRO, LRO). Single beam irradiation produces SRO, while two-beam interference irradiation produces a quasi-2D arrangement of nanoparticles with LRO and SRO. The pattern formation primarily occurs in the molten phase. An estimate of the thermal behavior of the film/substrate composite following a laser pulse is presented. The thermal behavior includes the lifetime of the liquid phase and the thermal gradient during interference heating. Based on this evidence, the SRO is attributed to spinodal dewetting of the film while surface tension gradients induced by the laser interference pattern appear to influence LRO [1]. [1] C.Favazza, J.Trice, H.Krishna, R.Sureshkumar, and R.Kalyanaraman, unpublished.

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Date submitted: 30 Nov 2005 Electronic form version 1.4