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Dynamic spatial ordering of nanostructures RAMKI KALYANARAMAN[1], WEI ZHANG, CHI ZHANG, Washington University in St. Louis — e We present results showing that the application of a rapid spatio-temporal surface modulation *in-situ* with film deposition directs the assembly of ordered structures. Co clusters of approximately 50 nm or 200 nm in size were assembled into one-dimensionally ordered arrays spaced 400 nm apart on Si (100) substrates during film growth of a 0.5 nm and 23 nm thick film, respectively. This ordered arrangement was achieved under e-beam evaporation of Co with simultaneous two-beam laser interference irradiation of the substrate. The ordering length scale was consistent with the theoretical two-beam fringe spacing. For the thicker Co film, the particles are irregularly shaped indicating a rapidly solidified liquid-like structure. The areal concentration of Co in the irradiated films is comparable to that in the unirradiated samples, suggesting that reevaporation is minimal. From this evidence, the mechanism for ordering is attributed mainly to material accumulation by spatially periodic laser interference heating of the growing cobalt film. Also, ordering is more readily observed for the dynamic experiments, as compared to irradiation after film deposition. This implies that laser-scattering from growing Co clusters is very important towards the observed ordering. This dynamic *in-situ* process is an economical and simple approach to assemble ordered nanostructured films.

[1]membership pending

Ramki Kalyanaraman
Washington University in St. Louis

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