Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**A level-set method for self-organized pattern formation during heteroepitaxial growth** CHRISTIAN RATSCH, UCLA, YOUNG-JU LEE, XIAOBIN NIU, RUSSEL CAFLISCH — We have developed an island dynamics model for heteroepitaxial growth that employs an island dynamics model with the level-set technique in combination with a fully self-consistent elastic model. At every timestep in the simulation, we solve the elastic equations for the entire system. This is possible within our approach because the numerical timestep can be chosen much larger than in an atomistic simulation. At every lattice site strain then changes the local bonding, and thus the potential energy surface for adatoms and the microscopic parameters of the simulation. In particular, strain changes the diffusivity of adatoms and enhances the rate of detachment from island edges. We will show how islands become smaller and more regular upon increasing strain. The reason is that bigger islands are typically more strained than smaller islands, and thus their growth is slowed down. We also present results that show that strain moves the system from layer-by-layer growth to the formation of coherent islands as a mechanism for strain relieve.

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Date submitted: 21 Nov 2006 Electronic form version 1.4