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Optimal Capping Layer Thickness for Stacked Quantum Dots XIAOBIN NIU, Department of Material Sciences and Engineering, UCLA, Los Angeles, CA 90095, CHRISTIAN RATSCH, Department of Mathematics/Institute for Pure and Applied Mathematics, UCLA, Los Angeles, CA 90095, YOUNG-JU LEE, Department of Mathematics, UCLA, Los Angeles, CA 90095, RUSSEL CAFLISCH, Department of Mathematics/Department of Material Sciences and Engineering, UCLA, Los Angeles, CA 90095 — We study the effect of strain on the vertical and lateral self-organization of nanoscale patterns and stacked quantum dots during epitaxial growth. The computational approach is based on the level set method in combination with an atomistic strain code. Strain changes the energetics of microscopic parameters during growth, and thus determines the nucleation sites and the growth of islands and dots. Our results show that strain can lead to vertical alignment as well as lateral organization. Moreover, our simulations suggest that there is an optimal thickness of the capping layer to get the best alignment and most uniform size distribution of stacked quantum dots.

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