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Buffer Layer Patterning of InAs/GaAs Quantum Dot Superlattices W. YE, M. REASON, X. WENG, R.S. GOLDMAN, The University of Michigan — The mechanisms of lateral ordering of quantum dots (QDs) are the subject of continued debate. For example, anisotropic "mounds" are often observed during GaAs growth, but their formation has not been related to QD alignment. Therefore, we have examined the patterning effects of buffer layers on the growth of InAs/GaAs QD superlattices (SLs). Multi- period InAs/GaAs QD SLs were deposited on GaAs buffer layers grown at 580^oC and/or 500^oC, with various annealing steps. Atomic force microscopy reveals that high temperature grown buffers consist of relatively flat surfaces, while low temperature grown buffers contain $[1\bar{1}0]$-elongated "mound-like" features. Isotropic distributions of QDs are observed for QD growth on flat buffers. For QD growth on buffers containing mounds, QD alignment along the $[1\bar{1}0]$ direction is observed. This alignment is enhanced as the number of QD SLs increases and is dependent on the density of mounds. We propose a new mechanism for lateral QD alignment, which is based upon patterning by undulated In-enriched GaAs spacer layers following the initials sets of QD SLs.

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