Temperature and Flux Dependence of Unstable Growth Mode on Patterned GaAs(001)\textsuperscript{1} TABASSOM TADAYYON-ESLAMI, HUNG-CHIH KAN, University of Maryland, SUBRAMANIAM KANAKARAJU, CHRIS RICHARDSON, Laboratory for Physical Sciences, RAY PHANEUF, University of Maryland — We report on the temperature and flux dependence of the growth mode of GaAs(001) during molecular beam epitaxy (MBE). Our previous results \cite{1} for growth on patterned GaAs(001) surfaces showed that growth under typical conditions produces a transient instability. Lowering the temperature beneath $\sim530\,^\circ\text{C}$ at a growth rate of $\sim0.3\,\text{nm/s}$ produces a qualitative change in the way that the corrugations evolve. This temperature is close to that of a preroughening transition in the absence of growth \cite{2}, however on increasing the As\textsubscript{2} flux the onset temperature for preroughening moves up, while the onset temperature of the growth mode change moves down. We correlate the change in growth mode with a change in the surface reconstruction. \cite{1} H. C. Kan, S. Shah, Tadayyon-Eslami, and R. J. Phaneuf., Phys. Rev. Lett, \textbf{92}, 146101, (2004). \cite{2} V. P. Labella et al. Phys. Rev. Lett. \textbf{84}, 4152, (2003).

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