Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Vertical Asymmetry and the Ripple Rotation Transition in the Epitaxial Growth and Erosion on (110) Crystal Surfaces LEONARDO GOLUBOVIC, Physics Department, West Virginia University, ARTEM LEVANDOVSKY, Department of Chemical and Petroleum Engineering, University of Pittsburgh — We theoretically elucidate the ripple rotation transition on Ag(110) crystal surface experimentally studied by de Mongeot and co-workers, as the transition between the Rectangular Rippled states (checker-board structures of alternating rectangular pyramids and pits). We show that the experimental diffraction patterns can be understood only by invoking the vertical growth asymmetry. Interestingly, we find that the ripple rotation transition occurs over an extended parameter range: The transition point where the qualitative change of the near in-phase patterns occurs turns out to be different from the one where the change of the out-of phase patterns occurs. In the proximity of the former transition point we find the four-lobe near in-phase diffraction pattern with the four peaks along the principal axed of the (110) surface, in accord with the experiments on Ag(110). Moreover, on the two sides of the extended ripple rotation transition, we find two novel interfacial states induced by the vertical asymmetry.

Leonardo Golubovic
Physics Department, West Virginia University

Date submitted: 26 Nov 2006 Electronic form version 1.4