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Effects of deposition angle in metal(100) epitaxial growth JACQUES G. AMAR, VALERY BOROVIKOV, YUNSIC SHIM, University of Toledo — The effects of oblique incidence on the surface roughness and morphology in Cu/Cu(100) epitaxial growth are investigated via multiscale kinetic Monte Carlo simulations in which the effects of shadowing and short-range (SR) and long-range (LR) attraction during deposition are taken into account via molecular dynamics simulations. Somewhat surprisingly, while the effects of deposition angle are found to be relatively weak at 200 K, at a slightly lower temperature (160 K) both the surface roughness and the growth exponent β depend strongly on deposition angle even for moderate deposition angles. These results resolve a long-standing puzzle regarding the growth behavior of Cu/Cu(100) over this temperature range. We also find that while the effects of shadowing and SR attraction play important roles, for moderate deposition angle the effects of LR attraction are relatively weak. Our results also demonstrate that, in general, the effects of deposition angle must be considered in low-temperature growth even for moderate deposition angles. Results for the surface morphology and roughness at higher temperatures and for very large deposition angles are also presented and compared with experiments.

> Jacques Amar University of Toledo

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