

Abstract Submitted
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Terrace-width Distributions on Vicinal Surfaces: Effective Attraction Between Noninteracting Touching Steps¹ RAJESH SATHIYANARAYANAN, AJMI BHADJ HAMMOUDA, T.L. EINSTEIN, University of Maryland, College Park — Terrace-width distributions (TWDs) characterize equilibrium as well as non-equilibrium morphology of vicinal surfaces. Using the terrace-step-kink (TSK) model, we apply Monte Carlo simulations (both Metropolis and kinetic) to study TWDs. Steps interact via inverse-square entropic and elastic interactions. Steps which cannot touch each other (except at corners) have monatomic height; their configurations, correspond to the worldlines of fermions in 1D. The associated TWDs are well described by the generalized Wigner surmise. The fit parameter (ϱ) is directly related to the dimensionless energetic interaction strength (\tilde{A}).² If steps are allowed to touch, one can find some double (or greater) height steps. For closely spaced steps, this can alter the TWD considerably. We simulated the TWD of steps with $\tilde{A} = 0$ but touching allowed. Our results indicate an effective attraction between steps, as reflected by a value of ϱ significantly less than 2 (the $\tilde{A} = 0$ value with touching forbidden). As expected, this effective attraction becomes weaker as the terraces become wider; we discuss the crossover behavior.

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²Hailu Gebremariam et al., Phys. Rev. B **69**(2004)125404

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