Abstract Submitted
for the TSF05 Meeting of
The American Physical Society

Terrace Width Distributions for Stepped Crystal Surfaces: An Ensemble Approach RYAN P. JACOB, HOWARD L. RICHARDS, Physics, Texas A & M University–Commerce — For almost 40 years, Terrace Width Distributions (TWDs) for stepped crystal surfaces have been calculated by the Gruber-Mullins (GM) approximation, which is derived from the fluctuations of a single step between two rigid neighbors at fixed positions. Much more recently, the Generalized Wigner Distribution (GWD) has been found to be a better approximation for TWDs. The GWD can be derived from two interacting steps confined in a harmonic well, and it has recently been shown to work well also for systems in which steps alternate in stiffness. Here we use an alternate approach, and consider an ensemble average of GM approximations in which the separation of the neighbors is allowed to change; this can be viewed as the limit in which the stiffness of alternating steps diverge, so the GWD is expected. A characteristic length along the steps must be introduced to perform the ensemble average. This length is in suprisingly good agreement with the length over which Step Position Distributions (SPDs) calculated from Monte Carlo simulation data agree with SPDs derived consistently with the GWD.

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Date submitted: 28 Sep 2005 Electronic form version 1.4