

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Modeling Island-Growth Capture Zone Distributions (CZD) with the Generalized Wigner Distribution (GWD): New Developments in Theory and Experiment¹ ALBERTO PIMPINELLI², T.L. EINSTEIN, DIEGO LUIS GONZÁLEZ, RAJESH SATHIYANARAYANAN³, AJMI BH. HAMOUDA⁴, U. Maryland — Earlier we showed [PRL 99, 226102 (2007)] that the CZD in growth could be well described by $P(s) = as^\beta \exp(-bs^2)$, where s is the CZ area divided by its average value. Painstaking simulations by Amar's [PRE 79, 011602 (2009)] and Evans's [PRL 104, 149601 (2010)] groups showed inadequacies in our mean field Fokker-Planck argument relating β to the critical nucleus size. We refine our derivation to retrieve their $\beta \approx i + 2$ [PRL 104, 149602 (2010)]. We discuss applications of this formula and methodology to experiments on Ge/Si(001) and on various organics on SiO₂, as well as to kinetic Monte Carlo studies homoepitaxial growth on Cu(100) with codeposited impurities of different sorts. In contrast to theory, there can be significant changes to β with coverage. Some experiments also show temperature dependence.

¹Supported by NSF-MRSEC at UMD, Grant DMR 05-20471.

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Date submitted: 23 Nov 2010

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