Capture-Zone Areas & the Wigner Distribution: New Case of Universal Scaling of Spacings in Fluctuating Systems[1] A. PIMPINELLI, UBP-Clermont 2 (France) & UM, T.L. EINSTEIN, U. of Maryland — When investigating scaling of island sizes during growth in d dimensions, one should consider the distribution of the areas of proximity cells around nucleation centers, i.e. capture zones (CZ). Using data from kinematic Monte Carlo studies,[2] we find that the CZ distributions in both $d = 1$ and $d = 2$ are well described by the generalized Wigner distribution (GWD) from random-matrix theory: $P_\varrho(s) = a s^\varrho \exp(-b s^2)$. $P_\varrho(s)$ accounts for a broad range of fluctuation phenomena, inc. the terrace-width distribution (TWD) on vicinal surfaces. For CZ distributions, we find $\varrho = i + d/2$, where i is the critical nucleus size. We present a phenomenological justification by constructing a Langevin equation similar to that used in accounting for the equilibration of TWDs.[3] We discuss implications for processing and analysis of experimental data.

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