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Off-Lattice 3D Eden Cluster Growth Model ERIC KUENNEN[1], University of Wisconsin Oshkosh — The Eden model for 2D clusters is understood to be in a large universality class of models and phenomena which have 1D surfaces with growth dynamics as predicted by the KPZ equation. However, the growth behavior of 3D Eden clusters, and that of the KPZ equation for 2D surfaces, is less well understood and a matter of some controversy. Determining which growth phenomena belong to the KPZ universality class in 3D is an important unsolved problem in statistical physics. Previous studies of the Eden model in 3D have all used an underlying lattice and grew clusters vertically from a flat substrate. Since Eden clusters grown on a lattice exhibit significant anisotropies, and in many natural phenomena growth occurs radially from a seed, in this paper, I propose a 3D Eden model for off-lattice clusters grown radially from a seed. With large-scale computer simulations, I investigate the kinetic roughening of the surface by estimating the surface-width growth exponent, in order to determine whether 3D Eden growth indeed belongs to the KPZ universality class. Noise-reduction techniques are used, and for validation the model is applied to a flat substrate geometry, which makes it possible to estimate the roughness exponent as well.

[1]Membership Pending

Eric Kuennen
University of Wisconsin Oshkosh

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