

Abstract Submitted
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Size-Topology Correlations and Crystallization in Tilings and Packings SASCHA HILGENFELDT, Mechanical Science and Engineering, University of Illinois at Urbana-Champaign — Empirical studies have long shown complex statistics in polygonal tilings of the plane or the corresponding packings of objects. Using a 2D variant of the granocentric model, we provide an analytical explanation for correlations of domain size and neighbor number, as well as for the relation between the widths of these two distributions characterizing the tiling or packing. The results agree with data from a large variety of living and inanimate systems [1]. This strictly local approach also gives insight into order-disorder transitions: A dramatic narrowing of the neighbor distribution indicates crystallization, for which well-defined disorder thresholds can be extracted both in systems with continuous disorder and in bidisperse systems, in very good agreement with simulation results [2].

- [1] M. P. Miklius and S. Hilgenfeldt, *Phys. Rev. Lett.* 108, 015502 (2012).
[2] S. Hilgenfeldt, *Phil. Mag.* 93, 4018 (2013).

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