Abstract Submitted
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Packing Squares in a Torus[1] DONALD BLAIR, CHRISTIAN SANTANGELO, JON MACHTA, University of Massachusetts Amherst — We study the densest packings of N unit squares in a torus (i.e., using periodic, square boundary conditions in 2D) using both analytical methods and simulated annealing. We find a rich array of dense packing solutions: density-one packings when N is the sum of two square integers, a family of "gapped bricklayer" Bravais lattice solutions with density N/(N+1), and some surprising non-Bravais lattice configurations – including lattices of holes, as well as a configuration for N=23 in which not all squares share the same orientation. We assess the entropy of some of these configurations, as well as the frequency and orientation of density-one solutions as N goes to infinity.

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