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Stripe-like nanoscale structural phase separation and optimal inhomogeneity in superconducting $BaPb_{1-x}Bi_xO_3$ PAULA GIRALDO-GALLO, Stanford University, YING ZHANG, Chinese Academy of Sciences, CAROLINA PARRA, Universidad Tecnica Federico Santa Maria, HARI MANOHARAN, MALCOLM BEASLEY, THEODORE GEBALLE, Stanford University, MATTHEW KRAMER, Ames Lab - Iowa State University, IAN FISHER, Stanford University — Structural phase separation in the form of partially disordered stripes, with characteristic length scales in the nanometer range, is observed for superconducting $BaPb_{1-x}Bi_xO_3$. The evolution of the superconducting coherence length with composition relative to the size of these stripes suggests an important role of the nanostructure in determining the shape of the superconducting dome. It is proposed that the maximum T_c is determined by a kind of "optimal inhomogeneity," characterized by a crossover from an inhomogeneous macroscopic superconductor to a granular superconductor for which phase fluctuations suppress T_c.

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