

Abstract Submitted
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Critical replica-symmetry-breaking transitions in finite dimensions SHO YAIDA, PATRICK CHARBONNEAU, Duke University — The transformation of the free-energy landscape from smooth to hierarchical is one of the richest features of mean-field disordered systems. A well-studied example is the de Almeida-Thouless transition for spin glasses in a magnetic field, and a similar phenomenon, the Gardner transition, has recently been predicted for structural glasses. The existence of these replica-symmetry-breaking phase transitions has, however, long been questioned below their upper critical dimension, six. Here, we obtain evidence for the existence of these transitions in physical dimensions, identifying a nontrivial fixed point through a two-loop calculation. We further corroborate the result by resumming the perturbative series with inputs from a three-loop calculation. Our analysis offers a straightforward resolution of the long-lasting controversy surrounding phase transitions in finite-dimensional disordered systems.

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