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**High-dimensional surprises neat the glass and the jamming transitions**

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The glass problem is notoriously hard and controversial. Even at the mean-field level, there is little agreement about how a fluid turns sluggish while exhibiting but unremarkable structural changes. It is clear, however, that the process involves self-caging, which provides an order parameter for the transition. It is also broadly assumed that this cage should have a Gaussian shape in the mean-field limit. Here we show that this ansatz does not hold, and explore its consequences. Non-Gaussian caging, for instance, persists all the way to the jamming limit of infinitely compressed hard spheres, which affects mechanical stability. We thus obtain new scaling relations, and establish clear mileposts for the emergence of a mean-field theory of jamming.