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Glass transition in structural-glass models RUBEN S. ANDRIST, Department of Physics, ETH Zurich, DEREK LARSON, Department of Physics, University of California, Santa Cruz, HELMUT G. KATZGRABER, Department of Physics, Texas A&M University & ETH Zurich — The 10-state Potts glass in mean-field is commonly used to study structural glasses because the equations describing the dynamics near the transition are mathematically similar to those for structural glasses. Simulations in three space dimensions show no sign of a transition into a stable glass phase. It is, however, unclear if a transition exists for high space dimensions below the upper critical dimension. We study the critical behavior of the 10-state Potts glass on a one-dimensional topology with power-law modulated interactions. The model has the advantage over conventional short-range systems in that large sizes can be simulated for high effective space dimensions. Furthermore, by changing the power of the interactions we can tune the system from the mean-field to the short-range universality class. Using parallel tempering Monte Carlo we probe the existence of a finite-temperature phase transition by studying the spin-glass susceptibility and the two-point finite-size correlation length. Preliminary results suggest that a stable glass phase might exist for finite space dimensions below the upper critical dimension.

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