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Renormalization group analysis of the random first order transition CHIARA CAMMAROTA, GIULIO BIROLI, IPhT, CEA/DSM-CNRS/URA 2306, CEA, Saclay France, MARCO TARZIA, GILLES TARJUS, LPTMC, CNRS-UMR 7600, Universite Pierre et Marie Curie, Paris — We consider the approach describing glass formation in liquids as a progressive trapping in an exponentially large number of metastable states. To go beyond the mean-field setting, we provide a real-space renormalization group (RG) analysis of the associated replica free-energy functional. The present approximation yields in finite dimensions an ideal glass transition similar to that found in mean field. However, we find that along the RG flow the properties associated with metastable glassy states, such as the configurational entropy, are only defined up to a characteristic length scale that diverges as one approaches the ideal glass transition. The critical exponents characterizing the vicinity of the transition are the usual ones associated with a first-order discontinuity fixed point.

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