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Structural Signatures of the glass transition CHI ZHANG, Department of Physics, Université de Fribourg, CH-1700 Fribourg, Switzerland., NICOLETTA GNAN, EMANUELA ZACCARELLI, CNR-ISC, UOS Sapienza, P.le A. Moro 2, Roma I-00185, Italy. Dipartimento di Fisica, Sapienza Università di Roma, P.le A. Moro 2, Roma I-00185, Ital, FRANK SCHEFFOLD, Department of Physics, Université de Fribourg, CH-1700 Fribourg, Switzerland. — The nature of colloidal glasses and the glass transition remains a topic of scientific interest. Scientists often focus on the study of dynamical properties since major structural changes have not been found to date in the vicinity of the glass transition. In this work we study both structural and dynamic signatures of the glass and jamming transition. Confocal microscopy measurements and molecular dynamic simulations are conducted on buoyancy and index matched microscale emulsion droplets with polydispersity of 12%, where crystallization is avoided. We find that the glass transition of such system is associated with detailed structural signatures on both global and local scales. At the global level, the peak amplitude of the radial distribution function shows a nonmonotonic evolution around a volume fraction of 59%. At the individual particle level, some local parameters such as the configuration of the nearest neighbors and the locally favoured structures also evolve differently across a volume fraction of about 59% whereas the jamming transition if clearly observed at higher densities 64.2%. Our results reveal clear structural signatures of the glass transition, which could help the further understanding of the underlying physical mechanism leading to dynamical arrest.

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