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Structural Details of Aging in Colloidal Glasses GIANGUIDO C. CIANCI, ERIC R. WEEKS, Department of Physics, Emory University, Atlanta, GA 30322 — Dense colloidal suspensions are good model glass formers. We use fast laser-scanning confocal microscopy, which allows real-time tracking of the trajectories of thousands of colloidal particles in 3-D, to study non-equilibrium phenomena in colloidal glasses. In particular we are interested in aging, the dependence of physical properties on the time elapsed since the creation of the sample. We investigate this non-equilibrium behavior in terms of colloidal packing. Tetrahedra, or triangular based pyramids, represent the ideal packing of 4 spheres in three dimensions, however they do not tile 3-D space. This frustration between local and global packing optimization has been invoked as a possible origin for the glass transition. We therefore study how these tetrahedra evolve as the sample ages. We are particularly interested in how the characteristics of tetrahedra, such as irregularity (the normalized standard deviation of the edge lengths of the tetrahedra), influence their dynamics. Furthermore, we study the correlations between the structure of tetrahedra and the dynamics of the particles that form them.

Gianguido C. Cianci
Department of Physics, Emory University, Atlanta, GA 30322

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