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3D confinement effect on diffusive behaviors of dense colloidal suspensions BO ZHANG, XIANG CHENG, Dept. of Chemical Engineering and Materials Science, Univ of Minnesota — We design an experimental system to investigate three-dimensional (3D) confinement effect on dense colloidal suspensions. By solidifying the aqueous phase of an oil-in-water emulsion, we achieve a 3D confinement with no-slip boundary conditions. Fast confocal microscopy is used to image dynamics of colloidal particles at different volume fractions and confinement lengths. We systematically measure particles' mean square displacement (MSD) and the system's overlap factor proposed in the random first order transition theory. Based on these measurements, a confinement "phase diagram" is constructed. We find a strong confinement effect for suspensions at moderate volume fractions with the confinement length smaller than 10 particle diameters. Finally, we also compare our results with other 3D confined systems with different boundary conditions including systems with slip boundaries and with fixed particle boundaries.

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