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**Influence of confinement by smooth and rough walls on particle dynamics in dense hard-sphere suspensions** BURAK ERAL, DIRK VAN DEN ENDE, MICHEL DUITS, FRIEDER MUGELE, Physics of Complex Fluids Group, University of Twente, PHYSICS OF COMPLEX FLUIDS GROUP, UNIVERSITY OF TWENTE TEAM — We used video microscopy and particle tracking to study the dynamics of confined hard-sphere suspensions. Our fluids consisted of 1.1-$\mu$m-diameter silica spheres suspended at volume fractions of 0.33–0.42 in water-dimethyl sulfoxide. Suspensions were confined in a quasiparallel geometry between two glass surfaces. First, as the separation distance (H) is decreased from 18 to 1 particle diameter, a transition takes place from a subdiffusive behavior (as in bulk) at large H, to completely caged particle dynamics at small H. These changes are accompanied by a strong decrease in the amplitude of the mean-square displacement (MSD) in the horizontal plane parallel to the confining surfaces. In contrast, the global volume fraction essentially remains constant when H is decreased. Second, measuring the MSD as a function of distance from the confining walls, we found that the MSD is not spatially uniform but smaller close to the walls.. Although confinement also induces local variations in volume fraction, the spatial variations in MSD can be attributed only partially to this effect. The changes in MSD are predominantly a direct effect of the confining surfaces. Hence, both the wall roughness and the separation distance (H) influence the dynamics in confined geometries.

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