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Structure and dynamics of a layer of sedimented microspheres near a horizontal planar wall[1] JERZY BLAWZDZIEWICZ, Texas Tech University, ADAR SONN, HAIM DIAMANT, Tel Aviv University, ELIGIUSZ WAJNRYB, MARIA EKIEL-JEZEWSKA, IPPT PAN, Poland, YAEL ROICHMAN, Tel Aviv University — Structure and dynamics of a sedimented layer of silica microspheres is investigated using computer simulations and confocal-microscopy measurements. The system is characterized by the particle area fraction ϕ_s and the dimensionless sedimentation parameter $l_0 = k_BT/(mgd)$, where k_BT is the thermal energy, m is the buoyancy-corrected particle mass, g is the gravitational acceleration, and d is the particle diameter. The range $0 < \phi_s < 0.62$ and $l_0 \approx 1.6$ is explored in our experiments. The near-wall particle distribution exhibits a layered structure, with the second layer developing at $\phi_s \approx 0.4$. Particle distribution is well described by a phenomenological model that involves equilibration of a quasi-two dimensional chemical potential. The effective self-diffusivity of the first and second particle layer has been determined. We find that the suspension microstructure is significantly affected by particle polydispersity, whereas the self-diffusivity is only moderately affected.

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