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**Dynamics of nanospheres near the free surface of dibutyl phthalate  $C_{16}H_{22}O_4$**  MARCIN SIKORSKI, SURESH NARAYANAN, Argonne National Laboratory, CHRISTIAN GUTT, BIRGIT FISCHER, HASYLAB at DESY, IVAN KUZMENKO, ALEC SANDY, Argonne National Laboratory — We present results from the study of the influence of free surface on the properties of colloidal suspensions. We studied the suspension of silica spheres in organic glass former, dibutyl phthalate DBP. A comprehensive picture of processes governing the relaxation of the colloidal system in the vicinity of liquid/vapor interface has been obtained using various surface-sensitive synchrotron-based experimental techniques. Measurements were performed over a wide temperature range from 300 K down to few degrees above the glass transition temperature  $T_g$  of DBP. The surface data are compared to the measurements in transmission geometry. GISAXS results indicate that the structure of the suspension is altered in the vicinity of the interface as compared to the bulk. This effect is more pronounced as the temperature of the sample is lowered. These findings agree well with the reflectivity data, showing dramatic increase of electron density in the direction normal to the surface upon approaching  $T_g$  of the solvent. Lowering the temperature is accompanied by a transition of the particle motion from diffusive at higher temperatures to ballistic-like close to  $T_g$ . Observed phenomena are reversible and behave in a systematic manner upon subsequent heating and cooling.

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