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Wetting-induced clustering and phoretic motions of colloidal particles THEYENCHERI NARAYANAN, ENRICO SEMERARO, RAJIV DATTANI, ESRF The European Synchrotron, F-38043, Grenoble — In recent years, self-propelled colloidal systems have received considerable attention as models for active matter. Most commonly used synthetic self-propelled systems involve Janus particles with asymmetric chemical composition in a catalytic medium. An analogous behavior can be obtained when particles are suspended in a phase separating binary liquid mixture due to preferential adsorption of one of the liquid species on the colloidal particles. Above an aggregation temperature (T_A), particles become attractive and aggregate to form compact colloidal clusters. In the two phase region of the binary mixture, particles partition into the phase rich in adsorbed component. We have used silica colloids suspended in a binary mixture of 3-methyl pyridine and heavy water to probe this adsorption-induced phoretic motion of particles. Using ultra small-angle X-ray scattering and photon correlation spectroscopy, we investigated the static and dynamic behavior of this system. In the one phase region below T_A, particles display a repulsive structure factor with diffusive dynamics. In the two-phase region of the host liquid, the static structure is similar but the dynamics is strongly enhanced with the onset of phase separation reminiscent of self-propelled motion.

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