

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Short-time self-diffusion of nearly hard spheres at an oil-water interface¹ PENGGER TONG, YUAN PENG, WEI CHEN, Department of Physics, Hong Kong University of Science and Technology, THOMAS FISCHER, Institute of Experimental Physics V, University of Bayreuth, DAVID WEITZ, Department of Physics and School of Engineering and Applied Sciences, Harvard University — Optical microscopy and multi-particle tracking are used to study hydrodynamic interactions of monodisperse polymethylmethacrylate (PMMA) spheres at a decalin-water interface. The short-time self-diffusion coefficient measured at low surface coverage has the form, $D_S^S(n) = \alpha D_0(1 - \beta n)$, where n is the area fraction occupied by the particles and D_0 is the Stokes-Einstein diffusion coefficient in the bulk suspension of PMMA spheres in decalin. The measured values of α are found to be in good agreement with the numerical calculation for the drag coefficient of interfacial particles. The measured values of β differ from that obtained for bulk suspensions, indicating that hydrodynamic interactions between the particles have interesting new features at the interface.

¹Work supported by the Research Grants Council of Hong Kong SAR.

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Date submitted: 10 Nov 2008

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