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**The Solid-Liquid Interface in a Colloidal Hard Sphere System**
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— The solid-liquid interface between a crystal and its melt is of great interest for both statistical physics and materials science. It constitutes the transformation front in solidification and has thereby considerable influence on the microstructure of metals or alloys. For example, the weak ($\sim$1%) anisotropy of the interfacial free energy is believed to be the origin of dendrite formation in solidifying metals.
We study the solid-liquid interface in a hard sphere colloidal suspension by confocal microscopy. Single crystals are grown by sedimentation of silica colloids in an index matched water-dimethylsulfoxide solution to a PMMA template prepared by lithographic techniques. The interplay between gravity and Brownian motion generates a volume fraction gradient in vertical direction, yielding a liquid layer on top of the crystalline sediment. Using confocal microscopy, this model interface can be studied at convenient time and length scales. In the same way as in computer simulations we try to obtain the interfacial stiffness from the Fourier spectrum of the capillary fluctuation waves. This type of simulation complements existing numerical work and offers the advantage of a large system size.

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