# Session 26aA

## Surface Energy and Contact Angle of the Superfluid $^3$He A-B Interface **26aA1**

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We have made two interface measurements below 300 $\mu$K, at zero pressure and in magnetic fields up to 400 mT. A variable magnetic field profile allows us to stabilize and precisely manipulate the position of the A-B interface. First, we can derive the difference in wall wetting energies from the behaviour of the phase boundary as it enters and exits a stack of glass capillary tubes. Secondly, we can measure the surface tension from the level of over- or under-magnetization needed to force the interface through an aperture. These are the first surface energy measurements in high magnetic fields in the zero-temperature limit. Our results are in surprising agreement with earlier measurements at high pressure close to $T_c$.

## The Growth of the Non-Wetting Liquid $^4$He Film on Cs **26aA2**

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It was theoretically predicted that the alkali metals Cs and Rb are the only surfaces non-wetted by superfluid $^4$He below a certain temperature $T_w$. This was experimentally proven for both systems. However, investigations have shown that the non-wetting thin-film state for the He-Cs system is extremely dilute for $T \ll T_w$ but close to $T_w$ it can be much thicker and of the order of monolayers. Using the photoelectron tunneling method we have sensitively measured the growth of the non-wetting thin-film state of $^4$He on a quench-condensed Cs surface. It turns out that far from co-existence there is little adsorption of helium. In contrast, close to co-existence a rapid growth up to two monolayers of helium is observed, but the surface is still non-wet under the usual convention. We interpret this behaviour on the basis of a 2-dimensional gas-liquid film and discuss the phase diagram in the non-wetting regime.

## 26aA3 Apparent dewetting of helium-4 driven by a superfluid flow.

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Silicon is known for long to be totally wetted by superfluid helium-4 at all temperatures. Yet, on a silicon substrate covered with a thick superfluid film, we observed a meniscus displaying a finite contact angle of about 5 degrees at low temperature. The observed pseudo-contact angle goes down to zero when temperature increases to the superfluid transition. The same features were observed for single droplets on the same substrate. All those properties can be quantitatively explained by the existence of a superfluid flow leading to a pressure decrease in the film, as proposed by S. Herminghaus.

## 26aA4 Slippage of Nonsuperfluid Helium Films

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We have reported that a part of nonsuperfluid films adsorbed on hectorite slip from the oscillation at low temperatures. To study whether these films adsorbed on other substrates undergo slipping, we measured the mechanical response of these films adsorbed on graphite using the quartz-crystal microbalance technique. As the temperature was lowered, the slippage was observed under certain conditions. This suggests that slippage of nonsuperfluid films takes place for various substrates.