

## Atomic force microscope force spectroscopy study of the electric double layer at a liquid crystal interface

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Electric force spectroscopy on an atomic force microscope has been used to determine the electric field distribution in the electric double layer at a liquid-crystal-glass interface. The separation-dependence of the electric force has been studied inside the liquid crystal interface, and screening of the surface electric field was observed (Figure 1). The results were compared with a simple theoretical analysis and a relatively good quantitative agreement was found. The method provides simple, accurate, and straightforward measurement of the Debye screening length, while the determination of the surface electric potential is less accurate. The observed Debye screening lengths are of the order of 50 nm and change when the interface is illuminated with UV light (1).

(1) M. Škarabot, and I. Muševič et al., *J. Appl. Phys.* **2009**, *105*, 014905

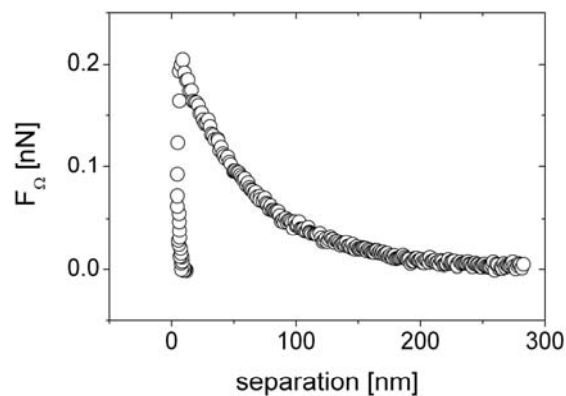


Figure 1. The first harmonic of the electric force across the LC-silanated silicon interface decays exponentially and the Debye screening length can be measured directly in real time.