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Wetting of liquid crystal surfaces and induced smectic layering at the nematic-liquid interface[1] MASAFUMI FUKUTO, OLEG GANG, BENJAMIN OCKO, Brookhaven National Laboratory, KYLE ALVINE, PETER PERSHAN, Harvard University — We present a synchrotron x-ray reflectivity (XR) study of the interfacial behavior of a bulk nematic 8CB surface that is coated by a thin wetting film of an immiscible liquid, perfluoromethylcyclohexane (PFMC). The thickness of the wetting film was controlled by the temperature difference $\Delta T_\mu = T - T_{res}$ between the sample and a reservoir of bulk PFMC. Interfacial electron density profiles have been extracted from the x-ray interference between the PFMC-vapor interface and the surface induced smectic order. The observed ΔT_μ dependence of thickness of the PFMC film, $L \propto (\Delta T_\mu)^{-1/3}$, is consistent with complete wetting. The liquid crystal side of the nematic-liquid interface is characterized by a density oscillation whose period is equal to the smectic layer spacing and whose amplitude decays exponentially towards the nematic subphase. The results indicate that the homeotropic orientation of the 8CB molecules is preferred at the PFMC-8CB interface and that the observed temperature dependence of smectic layer growth is consistent with a critical adsorption mechanism, independent of the PFMC film thickness.

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