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Water as a Wetting Agent for Liquid Crystal Films ERGYS SUBASHI, RAFAEL GARCIA, Worcester Polytechnic Institute — The dewetting of nCB liquid crystals from silicon wafer surfaces was first observed in 1999 [1] and has since grown into a subject of great fascination. The dewetting behavior occurs within a narrow coexistence region just below the nematic-to-isotropic phase transition temperature. When a wetted film is brought within this coexistence region, the film splits into two film thicknesses that are in apparent equilibrium with each other. A tentative but highly controversial explanation for this phase diagram has been proposed van Effenterre [2] in terms of mean field forces acting within the film. In our laboratory, we have undertaken a high-resolution measurement of the shape of this dewetting region for 5CB on silicon in search of evidence for the existence of fluctuation-induced forces that affect the thickness of these films. We have found, to our surprise, that ambient humidity affects the wetting behavior. Based on preliminary evidence taken thus far, water appears to act as a wetting agent that promotes the wetting of 5CB on silicon. We will present measurements showing how water affects the two-film thickness coexistence region. [1] F Vandenbrouck et al., Phys. Rev. Lett. 82, 2693 (1999). [2] D. Van Effenterre et al., Phys. Rev. Lett. 87, 125701 (2001).

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