

Abstract Submitted  
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**Lipid decorated liquid crystal pressure sensors**<sup>1</sup> TETIANA LOPATKINA, PIOTR POPOV, LAWRENCE HONAKER, ANTAL JAKLI, Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, Kent, OH 44242, ELIZABETH MANN, Department of Physics, Kent State University, Kent, OH 44242, MANN'S GROUP COLLABORATION, JAKLI'S GROUP COLLABORATION — Surfactants usually promote the alignment of liquid crystal (LC) director parallel to the surfactant chains, and thus on average normal to the substrate (homeotropic), whereas water promotes tangential (planar) alignment. A water-LC interface is therefore very sensitive to the presence of surfactants, such as lipids: this is the principle of LC-based chemical and biological sensing introduced by Abbott et al[1]. Using a modified configuration[2], we found that at higher than 10 micro molar lipid concentration, the uniformly dark texture seen for homeotropic alignment between left-, and right-handed circular polarizers becomes unstable and slowly brightens again. This texture shows extreme sensitivity to external air pressure variations offering its use for sensitive pressure sensors. Our analysis indicates an osmotic pressure induced bending of the suspended films explaining both the birefringence and pressure sensitivity. In the talk we will discuss the experimental details of these effects. [1] J. M. Brake, M. K. Daschner, Y.-Y. Luk, and N. L. Abbott, *Science* (80-. ). 302, 2094 (2003). [2] P. Popov, E. K. Mann, and A. Jakli, *Phys. Rev. Appl.* 1, 034003 (2014).

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