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Capillary wrinkling in thin film polymer annuli DAVID J. FARMER, JAMES S. SHARP, School of Physics and Astronomy AND Nottingham Nanoscience and Nanotechnology Centre, University of Nottingham, Nottingham, NG7 2RD, UK — A capillary driven wrinkling instability was studied in thin film ($\sim$ 350nm thick) annuli of polystyrene (PS) suspended on the aqueous sub-phase of a Langmuir-Blodgett (LB) trough. Surfactant was added around the outside of the annuli and the surface pressure/surface tension difference, P, between the inside and outside of the annuli was varied via the motion of the PTFE barriers of the LB trough. Radially oriented wrinkles were formed on the surface of the annuli above a critical value of the surface pressure difference and the number of wrinkles formed, n, was found to increase with increasing P. In this talk we will present a combination of experiments and a theoretical model that attempts to explain the process of wrinkle formation in these samples. This model shows that it is possible to extract parameters such as the elastic modulus of ultrathin film polymer samples from simultaneous measurements of n and P for annuli with internal and external diameters (a and b respectively) with values in the range 10 mm <a,b <25 mm.

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