

Abstract Submitted
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Simultaneous Measurement of Casimir Film Thinning and Superfluid Density in ^4He Films Near the λ -Transition¹ JOHN ABRAHAM, GARY A. WILLIAMS, UCLA, KONSTANTIN PENANEN, TALSO CHUI, Jet Propulsion Laboratory — Experiments are being undertaken to measure simultaneously the Casimir film thinning effect and the superfluidity density of ^4He films near T_λ . A silicon substrate with nanometer-scale roughness will be employed to minimize any effects of capillary condensation. The superfluid density and superfluid onset point will be monitored by third-sound propagation at resonant frequencies below 5 Hz. Metallic capacitor plates for both the thickness measurement and third sound detection will be evaporated on the back sides of the silicon wafers to avoid perturbing the film being measured. High-resolution thermometry will be employed to minimize heat input from temperature regulation, which can lead to fountain pressures and nonuniform film thickness. A precise location of the KT transition onset point relative to the film thinning may help to resolve existing discrepancies between theory and experiment.

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