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Capillary Condensation of Helium in Aerogels of Different Porosity JOHN BEAMISH, JAMES DAY, TOBIAS HERMAN, University of Alberta — When fluids are adsorbed in small pores, capillary forces are large and usually result in hysteresis between adsorption isotherms taken during filling and emptying. However, previous measurements with fluids in high porosity silica aerogels showed non-hysteretic behavior which could be interpreted as an equilibrium liquid-vapor coexistence curve. This curve was much narrower than in bulk fluid and the critical temperature, T_c, was suppressed. We have made direct capacitive pressure-density measurements near the critical point of helium confined in aerogels with porosities between 95% and 98%. We see hysteresis in isotherms in both aerogels and, although the aerogels fill over very narrow pressure ranges, we never see a true two-phase coexistence region. The hysteresis loops shrink and eventually disappear at about 5.155 K (in the 95% porosity aerogel) and 5.175 K (in the 98% porosity aerogel). We compare the shapes of the hysteresis loops in the two aerogels and how they evolve near the critical point. This work was supported by a grant from NSERC.

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