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Evidence for a disorder-phase transition in the condensation of ^4He in aerogels FABIEN BONNET, MATHIEU MELICH, LAURENT PUECH, PIERRE ETIENNE WOLF, Institut Néel CNRS-UJF — Although widely studied, capillary condensation of fluids in disordered mesoporous media is not fully understood. A central question is the origin of the hysteretic behavior between adsorption and desorption. It has been recently proposed that this hysteresis could result from the disorder of the porous media. Based on mean-field theoretical calculations, a disorder-driven transition is predicted, similar to that occurring in the Random Field Ising Model. Our earlier results on the condensation of helium in silica aerogel, combining thermodynamic (adsorption isotherms) and optical measurements, have provided a first evidence for such a transition. Here, we report new measurements on aerogels (porosity: 95%, 97% and 98.5%) , which further support the disorder scenario, and allow us to study the interplay between temperature and disorder. We also compare the case of aerogels to that of Vycor. Although a transition is not observed in Vycor, the dynamics of the adsorption and desorption processes lead us to conclude that disorder is also important in this case. F. Bonnet et al. Europhys. Lett. 82, 56003 (2008)

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