Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

A Study of the Superfluid Transition in Helium Films Adsorbed to a Rough CaF_2 Surface Over a Large Temperature Range MARTY SCHWARZ, LAURA WADLEIGH, DWIGHT LUHMAN, Carleton College — Rough two-dimensional substrates, such as thermally deposited CaF_2, have been shown to modify the experimental signatures of the superfluid transition in adsorbed thin helium films. Previous experiments have investigated a series of increasingly rough surfaces over a limited temperature range and found that the features at the superfluid transition become less defined as substrate roughness is increased. In this work we use a single rough CaF_2 substrate and study the superfluid transition in adsorbed helium films over a wide range of temperatures. Our results show that as the transition temperature increases the abrupt jump in superfluid density at the transition become less distinct. The changing characteristics of the transition on a single CaF_2 substrate with temperature suggest that the reduced observability of the transition on rough substrates cannot be explained entirely by simple surface geometry effects, such as tortuosity.

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Date submitted: 08 Nov 2012 Electronic form version 1.4