Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Dependence of Hysteresis Effect in Torsionally Oscillated Solid ^{4}He on ^{3}He Impurity Concentration[1] MICHAEL KEIDERLING, PATRYK GUMANN, DAVID RUFFNER , HARRY KOJIMA, Rutgers University — We studied the effects of ^{3}He-impurity on the hysteresis phenomenon in solid ^{4}He grown in an annular container as measured by a compound torsional oscillator (TO). The sample is cooled while oscillating at an initial high ($\sim$ 500 μm/s) velocity from a high temperature to a regulated target temperature where the Non-Classical Rotational Inertia fraction(NCRIf) is measured. The velocity is decreased to below a critical velocity of about 15 μm/s and then increased back to the original velocity where the NCRIf is measured again. The difference in the two NCRIf represents hysteresis. The difference is found to vanish (i.e. reversible) when the temperature is above a temperature $T_h(x_3)$ which depends on the ^{3}He impurity concentration x_3. T_h was measured for $x_3 = 0.3$, 6, 25 ppm. Surprisingly, T_h coincides with the phase separation temperature evaluated according to Edwards and Balibar theory [1]. [1] D. O. Edwards and S. Balibar, Phys. Rev. B 39, 4083 (1989)

[1]Supported in part by NSF grant DMR-0704120.

Michael Keiderling
Rutgers University

Date submitted: 19 Nov 2009 Electronic form version 1.4