

Abstract Submitted
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Dependence of Hysteresis Effect in Torsionally Oscillated Solid ^4He on ^3He Impurity Concentration¹ MICHAEL KEIDERLING, PATRYK GUMANN, DAVID RUFFNER, HARRY KOJIMA, Rutgers University — We studied the effects of ^3He -impurity on the hysteresis phenomenon in solid ^4He grown in an annular container as measured by a compound torsional oscillator (TO). The sample is cooled while oscillating at an initial high ($\sim 500 \mu\text{m/s}$) 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 $15 \mu\text{m/s}$ 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 ^3He 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)

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