Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Ultrasound propagation in polycrystalline solid ^{4}He[1] HARRY KOJIMA, Rutgers University, IZUMI IWASA, Kanagawa University, JOHN GOODKIND, UCSD — We are carrying out measurements of 10 MHz longitudinal ultrasound propagation in polycrystalline solid ^{4}He samples grown by the blocked capillary method. Temperature dependence of the velocity and attenuation of ultrasound are measured. The observed temperature dependence during cooling runs at $T > 200$ mK can be described qualitatively in terms of the effects of the motion of dislocation lines present in the samples. At $T < 100$ mK significant deviations from the higher temperature behavior are observed. Sharp anomalous changes in the velocity and attenuation appear near 70 mK. At the end of a cooling run at 20 mK, if the ultrasound excitation pulse amplitude is decreased below a threshold level, the attenuation decreases to a minimum and it remains constant at the minimum as the pulse amplitude is increased back up. The anomalous temperature dependence and the hysteretic behavior are discussed as possible consequences of ^{3}He impurity atoms being "condensed" onto dislocation lines.

[1]Research supported by NSF.

Haruo Kojima
Rutgers University

Date submitted: 14 Nov 2013 Electronic form version 1.4