

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The anomalous stiffness of ^4He crystals SEBASTIEN BALIBAR, XAVIER ROJAS, ENS, Paris, France, HUMPHREY MARIS, Dept of Physics, Brown University, Providence, USA — In 2007, Day and Beamish have discovered that the supersolid transition of ^4He crystals is accompanied by an increase in their shear modulus μ . They proposed that this stiffening is due to the pinning of dislocations by ^3He impurities. However, we have measured μ in single crystals which are free of any impurity. In such ultrapure crystals, we have found a stiffening which calls for a mechanism independent of ^3He content. This new mechanism might be Kuklov's roughening transition of dislocations or some interaction between Anderson's vortex liquid and the lattice. In order to discriminate between these two scenarios, we have built a cell which allows acoustic measurements in ideal ^4He crystals where there are no impurities and no dislocations. We will analyze the stiffness of single crystals in the presence of variable disorder.

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Date submitted: 16 Nov 2009

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