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Effect of Crystal Growth Velocity on "Supersolidity" of ^{4}He[1]
KEIYA SHIRAHAMA, MOTOSHI KONDO, SHUNICHI TAKADA, YOSHIYUKI SHIBAYAMA, Keio University — One of the most important issues of supersolid studies is to elucidate the relationship between the supersolid behaviors and quality of ^{4}He crystal. Recent observation of the annealing effect by Rittner and Reppy suggests that supersolidity is strongly dependent on the sample history. We have examined the effect of crystal growth velocity and crystal annealing on supersolidity of solid ^{4}He formed in a cylinder torsional oscillator[1]. Solid samples at various pressures are grown by cooling liquid ^{4}He under isochoric conditions (blocked capillary method). When the cooling velocity is high (0.1K/min) during crystal growth, the supersolid fraction is 3 times as large as that of slowly grown samples. This supersolid fraction decreased to 1/3 by sample annealings for 1 day near the melting point. On the other hand, no annealing effect is observed in the slowly grown samples. These behaviors strongly suggest that lattice defects formed in the crystal growth process play a crucial role on supersolidity of ^{4}He. [1] M.Kondo et al., J.Low.Temp.Phys., to be published

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