BCC vs. HCP - The Effect of Crystal Symmetry on the High Temperature Mobility of Solid ^{4}He

A. Eyal and E. Polturak

Physics Department, Technion, Haifa 32000, Israel

Torsional Oscillator (TO) experiments done on solid ^{4}He show a partial mass decoupling. First reported by Kim and Chan [1] , and later confirmed by many others, these results are under a debate regarding their interpretation as a sign of supersolidity. We performed TO measurements on solid ^{4}He at temperatures between 1.1K and 1.9K [2], and observed large mass decoupling associated with the generation of disorder. If this decoupling is due to dislocation movement, then the mass decoupling would depend on the growth direction with respect to the plane of motion. This would give a mass decoupling which is different for the two crystal symmetries. Our results on the subject will be presented.

[1]E. Kim and M. H. Chan, Science, 305, 1941 (2004)
[2]A. Eyal and E. Polturak, J. of Low Temp. Phys., 10.1007/s10909-011-0351-3 / arXiv:1102.5521 (2011)