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Hysteretic behavior in torsional oscillator experiments & de Gennes, Bean and Livingston effect in hcp ^{4}He[1] MINORU KUBOTA, Shibaura Inst. Techn., HIROAKI UEDA, Okinawa Inst. Sci. and Techn., MASAHIKO YAGI, NOBUTAKA SHIMIZU, Inst. Solid State Phys. Univ Tokyo, KRIS. ROGACKI, Inst. Low Temp and Struct Res. Pol. Acad. Sci., KAZUO INOUE, Shibaura Inst. Techn. — Recent reports on the absence of supersolid signal in ^{4}He in Vycor as well as reports on effects of the sample elasticity to torsional oscillator (TO) experiments caused people to ask if supersolid may not exist. There are recent activities to check such questions more quantitatively. We revisit our TO study, which was performed on relatively small number of bulk hcp ^{4}He samples, but under quite different conditions as under DC rotation as well as under wide range of AC excitation V_{ac} with extremely high stability. We proposed a transition at T_c =75($\sim$ 60) mK well below the onset temperature of the anomaly around 500 mK in the same sample. The transition at T_c was detected by three independent methods. Namely, the hysteresis appears below this T_c when AC excitation was changed under a certain sequence. We analyzed the maximum period shift across the hysteretic loop as a function of V_{ac}. This quantity appears abruptly below T_c and surprisingly its T dependence coincides with that of the extra energy dissipation rotational velocity Omega linear slope under DC rotation, also below T_c. We discuss that the maximum is caused by de Gennes, Bean and Livingston effect, which is a quantized vortices effect known for superconductors. The third T_c detection is given by a jump in the log V_{ac} linear dependence of the period shift.

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