

Rotation Measurement of Supersolid in Nanoporous Media

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After first discovery of supersolid¹, a lot of efforts, both experimental and theoretical, have been devoted to uncover the nature of its ground state whether it is quantum nature or not. Recently, we have observed the suppression of the non-classical rotational inertia (NCRI) with increasing DC angular rotation velocity.² One possible explanation of the result is that a new dissipation mechanism arises attributed to the quantized circulation under DC rotation. However, there might be some possible explanations for the result because of the motion of dislocation lines. The torsional oscillator measurement in nanoporous media under rotation allows us to elucidate this point further. Because the media is possible to pin the motion of the dislocation and affect the crystal defects and so on. In the present experiment, a torus-shaped Vycor glass with a pore size of ~ 6 nm is introduced into the torsional oscillator. We observe the suppression of the NCRI with increasing DC rotation speed the same as the bulk case reported in ref[2]. We will present and discuss the details of the experimental results.

¹E. Kim and M. Chan, Nature **427**, 225(2004)

²H. Choi, D. Takahashi, K. Kono, and E. Kim, Science **330**, 15 (2010)