

Supersolidity under AC and DC rotations

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We have recently proposed an explanation of the supersolidity effect in terms of the Bose Einstein condensation of kinks of dislocations. In this talk we discuss our understanding of some current experimental results in our picture.

Under an AC rotation field alone, a suprisingly low critical rotation velocity is observed experimentally. We estimate the critical velocity as one that can create a kink wave of wavevector of the order of $1/L$ where L is the distance between nodes of the dislocation network. With no adjustable parameter, order of magnitude agreement with the experimental critical velocity is found.

Recently several experimental groups have studied the supersolidity effect under both a steady and a oscillating rotation. We incorporate the effect of the DC rotation by calculating its effect on the phonon frequency and thus the kink wave. The effect of the DC rotation is found to be very different from the AC rotation.