Off Diagonal Long Range Order in Low Temperature Solid Helium

BRYAN CLARK, University of Illinois Urbana Champaign Physics Department, DAVID CEPERLEY — Experiments have recently produced evidence of the existence of a supersolid $^4\text{He}$. One of the important properties of equilibrium superfluid/supersolid behavior is the existence of off diagonal long range order, defined in terms of the 1-body density matrix as $\lim_{|r-r'|\rightarrow\infty}\rho(r,r') > 0$. Using path integral monte carlo, we calculate the off diagonal density matrix for solid $^4\text{He}$ at temperatures near the experiment and find it is very small at large $r$. 

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