

When is a Quantum Gas a Quantum Liquid?

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Bose-Einstein condensation was invented originally by theorists because it was too hard for them to understand superfluid helium. B.E.C. in a dilute gas was promoted as a simple theoretical model that could yield insight into the nature of superfluidity, while avoiding the messy reality of liquids, with all their strongly correlated atoms. But maybe that messiness was not such a bad thing after all. Maybe if you could dial up the messiness gradually, you could better understand the microscopic nature of a superfluid liquid. I'll report on our efforts to characterize the dispersion relation of a strongly interacting degenerate Bose gas.