

# Critical temperature of dirty bosons

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We consider a dilute Bose gas moving in a harmonic trap with a superimposed frozen random potential which arises in experiments either artificially with laser speckles or naturally in wire traps. The critical temperature, which characterizes the onset of Bose-Einstein condensation, depends on the disorder realization within the ensemble. Therefore, we introduce an effective grand-canonical potential from which we determine perturbatively the disorder averages of both the first and second moment of the critical temperature in leading order. We discuss our results for a finite number of particles by assuming a Gaussian spatial correlation for the quenched disorder potential.