Thermodynamic properties of the three-dimensional Bose-Hubbard model[1] BARBARA CAPOGROSSO-SANSONE, EVGENY KOZIK, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, Department of Physics, University of Massachusetts, Amherst — We have studied the thermodynamics of the three dimensional Bose-Hubbard model by means of exact quantum Monte Carlo simulations. We present accurate thermodynamic curves, including those for entropy and specific heat, for the homogeneous and inhomogeneous system. We also present numerical data for the on site number statistics and compare numerical curves to experimental ones, using temperature as the only free parameter. Our data can serve as a basis for accurate experimental thermometry and a guide for appropriate initial conditions if one attempts to use interacting bosons in quantum information processing.

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