

Quantitative thermometry of the 2D Hubbard model in optical lattices on approach to the Neel transition

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We study the two-dimensional Hubbard model at half filling using the systematic-error-free Determinant Diagrammatic Monte Carlo method. We simulate mesoscopic sized samples with varying shapes and boundary conditions, and calculate the temperature dependence of the spin-spin correlation function. Our results can form a basis of quantitative determination of temperature in recent and ongoing experimental realizations of the Hubbard model with ultracold atoms in optical lattices.