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Dynamics of $S = 1/2$ Antiferromagnetic clusters[1] LING WANG, ANDERS SANDVIK, Boston University — A site diluted 2-d Quantum Heisenberg Antiferromagnet undergoes a Neel to disordered phase transition at the classical percolation density p^*, since the sublattice magnetization m has a nonvalishing value on the percolating cluster. Although this implies that some of the exponents of the transition are equal to those of classical percolation, exponents involving dynamics are non-classical. We investigate the quantum dynamics of diluted systems at the percolation point by Lanczos diagonalization, generating histograms of the singlet to triplet excitation gap Δ for clusters of different size N. We investigate the finite-size scaling of the average and typical Δ, to determine the dynamic exponent z. In a clean d-dimensional system with Neel order, Δ scales as $1/L^z$ with $z = d$, which arises from the quantum rotor states when the rotational symmetry has not been broken. As a direct generalization, it has been proposed that $z = D_{\rm f}$ holds for the percolating clusters, where $D_{\rm f}$ is the fractal dimensionality; $D_{\rm f} = 91/48$. This has not been confirmed numerically, however, and there remains the possibility that there could be other excitations of the clusters leading to $z > D_{\rm f}$. In addition to the Lanczos calculations, we also investigate the the distribution of the stagged susceptibility $\chi(\pi, \pi)$ and the stagged structure factor $S(\pi, \pi)$, which give information on the quantum dynamics through sum rules.

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