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Linearly dispersing spinons at the deconfined quantum critical point HIDEMARO SUWA, Department of Physics, The University of Tokyo, ARNAB SEN, Department of Theoretical Physics, Indian Association for the Cultivation of Science,, ANDERS SANDVIK, Department of Physics, Boston University
— We have studied the level structure of excitations at the "deconfined" critical point separating antiferromagnetic and valence-bond-solid phases in two-dimensional quantum spin systems using the J-Q model as an example. Energy gaps in different spin (S) and momentum ($\mathbf{k}$) sectors are extracted from imaginary-time correlation functions obtained in quantum Monte Carlo simulations. We find strong quantitative evidence for deconfined linearly dispersing spinons with gapless points at $\mathbf{k} = (0,0)$, $(\pi,0)$, $(0,\pi)$, and (π,π), as inferred from two-spinon excitations ($S = 0$ and $S = 1$ states) around these points. We also observe a duality between singlet and triplet excitations at the critical point and inside the ordered phases, in support of an enhanced symmetry, possibly SO(5).

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