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Broken Symmetries and Gapless Excitations of SU(N) Antiferromagnets Investigated With Variational Wavefunctions ARUN PARAMEKANTI, UC Berkeley, BRAD MARSTON[1], Brown University — We use Gutzwiller-projected wavefunctions to investigate variationally the phase diagrams of SU(N) quantum antiferromagnets in the self-conjugate representation. The method is first tested against the known phase diagram of a one-dimensional SU(4) bilinear-biquadratic spin chain which has a quantum-critical point separating a dimerized phase from a phase with spontaneously broken charge-conjugation symmetry[2]. In the case of two-dimensional SU(N) antiferromagnets, recent analytical[3] and numerical[4] work suggests the existence of a gapless spin-liquid phase with no broken symmetries. Such a phase would be consistent with a recent generalization of the Lieb-Schultz-Mattis theorem[5] to more than one spatial dimension. We examine the stability of the π-flux phase against tendencies to spin-order, crystallize into various valence-bond solids, or break charge-conjugation symmetry.

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