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S-duality in lattice N=4 super Yang-Mills

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Formulations of lattice supersymmetry over the last decade have been able to significantly reduce the amount of fine-tuning necessary in order to obtain the correct continuum limit. In the case of N=4 super Yang-Mills, the approach that has emerged as the best path forward is based on a topological twisting of the theory. Monotonen and Olive found evidence that a duality could exist in Yang-Mills with adjoint scalars. In this scheme, the 't Hooft-Polyakov monopole is dual to the W boson, leading to a theory equivalent to the original one, but with magnetic charge replacing electric charge. The duality is believed to be realized in N=4 super-Yang-Mills. We are pursuing numerical, nonperturbative evidence for this S-duality using our lattice formulation. The various tricks that are necessary for doing this will be described.

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