Structure and properties of the vacuum of the Twisted Eguchi-Kawai model

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We investigate numerically the phase structure of the Twisted Eguchi-Kawai (TEK) model in four dimensions. In the numerical simulations of the zero-temperature TEK model (using a symmetric twist) we observe the existence of new phases breaking its $Z_4^2$ symmetry at intermediate lattice couplings and for large SU($N$) gauge groups (hep-th/0612097). This effect can be explained by the contribution of diagonal configurations with collapsed eigenvalues, which are particular cases of non-surviving fluxons (in the sense of van Baal). We also investigate finite-temperature versions of the TEK model using anisotropic lattice couplings, where in particular we find surviving fluxons contributing at large anisotropies.