Determination of the running coupling in pure SU(4) Yang-Mills theory

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The Schrödinger functional is used to define a renormalised coupling for pure SU(4) Yang-Mills theory, with Wilson action and suitably selected boundary conditions on the link field. The coupling, which runs with the size of the lattice, is then determined by a finite-size scaling technique through a large range of momenta, thereby allowing a connection to be made between the low-energy non-perturbative regime and the high-energy regime, where contact is made with known perturbative results. Using also data for SU(2) and SU(3) obtained with the same technique, the running of the ’t Hooft coupling defined through the Schrödinger functional is studied and compared with results obtained in other renormalisation schemes.