Complete spectra of the staggered Dirac operator and their relation to Polyakov loops

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We represent Polyakov loops as spectral sums of eigenvalues of the lattice Dirac operator for different boundary conditions. In quenched QCD the averaged Polyakov loop is an order parameter for the confinement-deconfinement transition. On the other hand the chiral condensate, which can be related to the spectral density at the origin, is a measure for chiral symmetry breaking. We analyze the role of the eigenvalues in the spectral sums below and above the critical temperature. For that purpose we calculate all eigenvalues of the staggered Dirac operator for several boundary conditions. We show that for the considered spectral sums the Polyakov loop gets its main contributions from the UV end of the spectrum.