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Non-perturbative study of the chromagnetic operator on the lattice

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We describe our study of the chromomagnetic operator O_CM, which appears in the effective Hamiltonian describing DS=1 transitions in and beyond the Standard Model.

Having dimension 5, the chromomagnetic operator is characterized by a rich pattern of mixing with other operators of equal and lower dimensionality. We have computed the coefficients of the mixing with the various dimension 5 operators using one loop lattice perturbation theory and determined the power-divergent mixing coefficient with the scalar density non-perturbatively. The numerical computations have been carried out by using the gauge configurations produced by the European Twisted Mass Collaboration with $N_f = 2 + 1 + 1$ dynamical quarks, at three values of the lattice spacing and several values of the light quark masses.

In this talk, we will mainly describe the non-perturbative parts of the calculation and present preliminary results for the matrix element of the chromomagnetic operator between pion and kaon states.

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