Overlap hypercube fermions in QCD with light quarks

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Abstract: The overlap hypercube fermion is constructed by inserting a hypercubic kernel (instead of the Wilson operator) into the overlap formula. This leads to chiral lattice fermions with improved properties compared to the standard overlap fermion. We present recent results with this lattice fermion formulation in quenched QCD with light quark masses m_q. In the p-regime we evaluate the pion mass and the rho mass as a function of m_q, along with the renormalisation factor Z_A. In the ϵ-regime we extract values for the leading low energy constants of the chiral Lagrangian, F_π and Σ. Finally, at $m_q = 0$ we present new resutls for the locality bound at strong gauge coupling, and for the topological susceptibility.