Quark mass determination from 2+1 flavor domain wall fermion simulations

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We present results on the masses of the average light (up and down) and the strange quark mass from simulations using \( N_f = 2 + 1 \) flavors of dynamical domain wall fermions. Two sets of ensembles are taken into account in this analysis, both with a lattice spacing of \( a \approx 0.12 \) fm \( (a^{-1} \approx 1.6 \text{ GeV}) \) generated with the Iwasaki gauge action, but having different lattice sizes: \( L^3 \times T \times L_s = 16^3 \times 32 \times 16 \) and \( 24^3 \times 64 \times 16 \), giving a spatial volume of \( (aL)^3 \approx (2 \text{ fm})^3 \) and \( (3 \text{ fm})^3 \), respectively. The simulated pion masses are in the range of 310 to 620 MeV. The non-perturbative renormalization technique of the Rome-Southampton group is employed, while extrapolation to the light physical masses is guided by chiral perturbation theory.