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The QCD phase diagram from lattice calculations (15' + 5')

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We calculate the crossover line between the quark gluon plasma and the hadron gas phases for small real chemical potentials using lattice calculations. Since direct calculations at non-vanishing chemical potentials are hindered by the sign problem we use imaginary chemical potentials and perform analytic continuation to obtain the real μ phase diagram. We use a 4stout staggered fermion action on lattices up to a temporal extent of $N_t = 16$ and perform a continuum extrapolation. In order to describe the situation in heavy ion collisions the simulation parameters are tuned such that strangeness neutrality is maintained. For the curvature of the transition line we find that there is an approximate agreement between values from three different observables: the chiral susceptibility, chiral condensate and strange quark susceptibility.

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