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Exploring the QCD phase diagram via reweighting from isospin chemical potential

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We investigate the QCD phase diagram close to the isospin chemical potential axis. Numerical simulations directly along this axis are not hindered by the sign problem and pion condensation can be observed at high enough values of the isospin chemical potential. The possibility of a crossover transition from this BEC phase to a BCS phase is investigated. We study how the BEC phase boundary evolves in the baryon and strangeness chemical potential directions via reweighting in the quark chemical potentials and discuss our results. Furthermore, we develop an alternative method to approach nonzero baryon chemical potentials. This involves simulations including auxiliary quarks of an extended isospin doublet and decoupling them by increasing their mass, again via reweighting.

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