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The QCD phase diagram and the critical end point at large N_c

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We investigated the QCD phase diagram at large N_c in a Polyakov loop extended quark-meson model with particular attention to the critical point(s). An exciting behavior was seen, as the well-known $N_c = 3$ CEP disappears rapidly and leaves a crossover transition in the whole phase boundary. Furthermore, for large enough N_c, a distinct CEP emerges along the temperature axis. Moreover, besides the confined chirally broken and the deconfined chirally symmetric phase, the quarkyonic-type phase was found, which shows confinement and chiral restoration. For these regions of the phase diagram, the pressure also had the expected N_c^0, N_c^2, and N_c^1 scaling, respectively.

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