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The critical endpoint at large N_c

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The phase diagram of QCD is investigated by varying number of colors N_c within a Polyakov loop quark-meson chiral model. In particular, our attention is focused on the critical point(s); the critical point present for N_c=3 moves toward the mu_q-axis and disappears as soon as the number of color is increased. Yet, a distinct critical point emerges along the temperature axis for N_c=53 and moves toward finite density when increasing N_c further. Thus, the phase diagram at large N_c looks different than the N_c=3 results, since in this case the first-order transition is in the upper-left, while the crossover is in the lower-right regions of the (mu_B-T)-plane. The N_c dependent pressure is also evaluated, which shows a scaling with N_cˆ0 in the confined and chirally broken phase and with N_cˆ2 in the deconfined one. Moreover, a chirally symmetric but confined "quarkyonic phase"can be seen at large density and moderate temperature with a pressure proportional to N_c.

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