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The Linear Sigma Model coupled to quarks to explore the QCD phase diagram.

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We use the linear sigma model coupled to quarks to compute the effective potential beyond the mean field approximation, including the contribution of the plasma screening effects, at finite temperature and density. We determine uniquely the model coupling constants (the only free parameters in the model) and use them to study the phase diagram in the temperature-baryon chemical potential plane and to estimate the position of the critical end point.

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