

# THE PHASE DIAGRAM OF QCD

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Quantum Chromodynamics predicts that at some large temperature or density the strongly interacting matter transforms from the gas of observed hadrons into the plasma of quarks and gluons, ordinarily confined inside the hadrons. Since the inception of QCD the fundamental question of when and how this transformation is accomplished has been driving theoretical and experimental research.

The phase diagram of QCD, the nature of the phases and the dynamics of QCD in the regime relevant to heavy ion collision experiments presents many challenges due to the nonperturbative character of QCD interactions. It is necessary to develop new theoretical ideas and tools to study these phenomena.

I shall overview the recent progress in the understanding of the QCD phase diagram, discuss past and present challenges, such as the nature and the location of the transition and of the critical point, and outline the strategies for discovering the features of the phase diagram in the heavy ion collision experiments.