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Exploring the Phase Diagram of Hot Quantum Chromodynamics

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A primary focus of current heavy-ion research at several accelerator facilities is the study of QCD matter under extreme conditions. I will discuss recent progress, involving investigations spanning a broad range of systems and beam collision energies to: (I) develop a comprehensive understanding of reaction dynamics, (II) chart the phase structure of the QCD phase diagram, and (III) delineate the thermodynamic, topological, and transport properties of the respective QCD phases. These studies emphasize not only the comprehensive RHIC-STAR data sets for different beam energies and collision systems but also synergistic data sets obtained at the LHC, to explore a broad domain of the (T, μ_B) -*plane of the QCD phase diagram*.