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Hard Probes of the Quark-Gluon Plasma: Introduction and Overview

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The Quark-Gluon Plasma formed at the Relativistic Heavy-Ion collider (RHIC) is strongly interacting. Hard probes present the most rigorous tool in the study of the partonic substructure of the produced matter, where, the presence of a hard scale allows for the use of techniques based on perturbative QCD and factorization. These include a series of single jet observables, multi-particle jet correlations, jet-medium correlations as well as heavy quark and electromagnetic probes. The different approaches and approximation schemes used in the study of jet modification in dense matter are reviewed and major results reported. A variety of new jet correlation observables are outlined and their possible explanations and implications for the structure of the produced matter discussed.