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The standard model for relativistic heavy-ion collisions and electromagnetic tomography

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The relativistic heavy-ion programs at the Relativistic Heavy-Ion Collider (RHIC) and the Large Hadron Collider (LHC) is entering a new era of precision investigation into the behavior of deconfined, strongly-interacting matter – the Quark-Gluon Plasma (QGP). In this talk, focused on work done for my dissertation, I introduce a standard theoretical framework to study the bulk dynamics and electromagnetic probes of relativistic heavy-ion collisions. With this framework, a broad range of phenomenological studies on hadronic and electromagnetic observables has been done and utilized to extract information about the transport properties of the QGP as well as about the initial state fluctuation spectrum. Electromagnetic tomography provides complementary constraints on determining the QGP viscosities.