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Heavy quarks and quarkonia at RHIC and the LHC

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Heavy flavor is produced across vastly different energy ranges and at different densities at the LHC from what has been studied at the RHIC. This may lead to the study of different energy loss mechanisms and different production channels for quarkonium using these two complementary experiments. This talk will review the current understanding of heavy quark dynamics at finite temperature and then will focus on results where the quarkonium dissociation rates are exactly related to the heavy quark momentum diffusion coefficient. Finally, in-medium hadronization of quarkonium will be discussed, as well as its implications for the production of rare heavy quark bound states.