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Heavy Quark Correlations and J/ψ Production in Heavy Ion Collisions[1] REZA NIAZI, YUNPENG LIU, CHE-MING KO, Cyclotron Institute, Texas A&M University — Quark Gluon Plasma (QGP), a phase of QCD matter, was the temporary state that all matter had in the universe microseconds after its creation, which has been produced in high energy nucleus-nucleus collisions at the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC). Normally being bound inside a proton or neutron, due to the strong nuclear force, the QGP is a hot "soup" of quarks and gluons that move relatively freely. QGP is still a very enigmatic state of matter; therefore, active work is being done in trying to understand what is left behind after this short-lived state of matter disintegrates. This includes the abundance of the charmonium meson that consists of a pair of heavy charm and anticharm quarks. In this study, a QGP simulation called the Parton Cascade Model is used with two different initial conditions to see if charm and anticharm quarks can create a charmonium meson in the expanding QGP. In the simulation, the charm quark pair is initially either correlated, with opposite momenta but same position, or uncorrelated, with random momenta and positions, within the QGP. Understanding the difference of the amount of charmonium mesons produced in these two conditions will be helpful in developing theoretical models for charmonium production in heavy ion collisions and thus determining the properties of QGP from experimental measurements.

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