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Time-dependence of the survival probability of the Charmonium in Nuclear and Quark-Gluon-Plasma media JASON PROCHASKA, CATHERINE HUBER, ATHANASIOS PETRIDIS, Drake University — The time-dependent Schrodinger equation is used to study the formation of charmonium in heavy ion collisions and its propagation in Quark-Gluon Plasma (QGP) and nuclear matter. The initial bound (ground) state is computed using imaginary-time propagation in a confining potential with an asymptotically-free region in 3 dimensions. The QGP is simulated with a time-dependent potential of an extended asymptotic-freedom region. The initial quark-antiquark system propagates in real time but the charmonium bound state may become fully developed before or after the QGP formation. The formation and QGP-hadronization time scales determine the kind of potential in which the system propagates. The survival probability is calculated versus time for various potential parameters and relative momenta of the charmonium by projecting the interacting wavefunction onto its freely-propagating counterpart. The staggered-leap frog method is used with special attention paid to the issue of stability. The calculation is done in 3 dimensions using the center of momentum of the quark-antiquark pair as the frame of reference. The decay is non-exponential. Connection with experiments is done by means of cross-section ratios. Suppression and enhancement are both possible depending on the time scales.

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