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Memory effects in high energy nuclear collisions

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Stochastic processes with memory are characterized by noises that possess correlations at different times; namely, the stochastic terms in the differential equations at a time t have memory of the noise at previous times.
Heavy ion collisions are an interesting framework in which processes with memory take place,
in particular when one considers the very early, out-of-equilibrium stage that is dominated by the intense fields of the evolving Glasma.
In this talk, we discuss the diffusion of heavy quarks in the early stages of heavy ion collisions, in which the stochastic term is furnished by
the strong (and random) gluon fields that develop in the interaction region of the two colliding objects.
Then we turn to quantitative estimates of the effects of the diffusion in the early stage on the nuclear modification factor, particle correlations
and elliptic flow of heavy mesons. Finally, we discuss the applicability of generalized Langevin equations to the diffusion of heavy probes in the early stages.

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