

# Effects of memory on quarkonium evolution in quark gluon plasma

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Heavy-Quarkonia evolution in quark-gluon plasma (QGP) can be studied using the framework of open quantum systems. The density matrix of the quarkonia satisfies a simple Lindblad-type equation if one assumes that the binding energy  $E_b$  is much smaller than the medium temperature  $T$ . This approximation does not hold for a significant part of the QGP evolution. We study the evolution of quarkonia in the regime when  $E_b \sim T$  by solving general master equations for the density matrix, which include the effects of memory. Mainly we calculate suppression of  $\Upsilon(1S)$  at CMS and RHIC energies. For the background medium, we use results from a realistic viscous 2+1 hydrodynamic simulation, which gives a good description of the phenomenology of the soft particles.

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