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Comprehensive Analysis of in-Medium Quarkonia from SPS to LHC

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We employ a kinetic rate-equation approach in a thermally expanding medium to compute the suppression and regeneration of quarkonia in heavy-ion collisions [1]. The in-medium properties of quarkonia figuring into the rate equation (widths, binding energies and heavy-quark masses) are constrained by euclidean correlators from lattice QCD. Input cross sections for heavy quarks and quarkonia, as well as cold nuclear matter effects, are constrained by pp and pA/dA data as available. Formation-time effects and bottom feeddown, mostly relevant at high transverse momentum (p_t), are accounted for. The thermal relaxation time of heavy quarks, controlling the regeneration contribution, is adjusted to central AA data at SPS and RHIC. The approach is applied to pre- and postdict charmonium [1,2] and bottomonium [3] production as a function of centrality, p_t, rapidity, and collision energy in comparison to data from NA50, PHENIX, STAR, ALICE, CMS and ATLAS. Systematic trends and areas of potential disagreement are identified.

[1] X. Zhao and R. Rapp, Phys. Rev. C82 (2010) 064905.
[2] X. Zhao and R. Rapp, Nucl. Phys. A859 (2011) 114.
[3] A. Emerick, X. Zhao and R. Rapp, Eur. Phys. J. A (2012) in press.

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