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In-Medium Transport of charmonia, X(3872) and B_c at the LHC

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We investigate the in-medium kinetics of heavy quarkonia focusing on recent developments and results for the $\psi(2S)$, X(3872), and B_c particles in ultra-relativistic heavy-ion collisions (URHICs). Based on our previous calculations, our approach is governed by two transport parameters for each quarkonium state: the equilibrium limit and inelastic reaction rate. The equilibrium limits are entirely determined by the particles' masses and the charm-quark and bottom-quark fugacities. The reaction rate for the $\psi(2S)$ was previously constrained by analysis of d-Au and p-Pb collisions at RHIC and the LHC. The rate for the X(3872) is evaluated depending on its structure, being "large" for a DD^* molecule and "small" for a tetraquark (diquark-antidiquark). The reaction rate of the B_c is calculated in the quasi-free approximation based on binding energies extracted from in-medium T-matrix calculations. We assess the sensitivity of the final X(3872) yields and p_T spectra on different scenarios for its width and initial conditions. We find that the final yields of the molecule structure are generally smaller than for the tetraquark, by around a factor of two, which is qualitatively different from calculations using instantaneous coalescence models. We also present our predictions for the centrality and transverse-momentum dependence of the R_{AA} for $\psi(2S)$ and B_c and discuss it in the context of recent experimental data.
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