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A systematic primer for the rescattering of heavy flavor hadrons

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In this work, we systematically study the effects of hadronic rescattering on heavy flavored hadrons. With the hadronic transport approach SMASH, we create the most basic approximation of a hadronic afterburner – a thermalized and expanding sphere of hadron gas –, where we observe the "pion wind" phenomenon and its dependence on the cross section assumption. Further in complexity, we introduce fast-moving heavy mesons, arisen from quarks created in the initial hard scatterings. They are slowed down nearly independently of the initial momentum, hinting at thermalization. They are also deflected in the medium by an amount that depends on which cross sections are used, possibly hinting at the mechanism for anisotropic flow generation. Within this setup, we also see a depletion in charmonia due to the process $J/\Psi(+N) \rightarrow D\bar{D}(+N)$. Moreover, due to the large (semi)leptonic branching ratio, the rescattering of heavy hadrons decreases the phase space of resulting dileptons, so we investigate how this affects their opening angle and invariant mass spectra. Such a study on a comprehensive set of observables related to heavy flavor hadrons is the first step for higher precision predictions in full dynamical hybrid approaches.

Category

Theory

Collaboration

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