

Heavy-quark azimuthal correlations in heavy-ion collisions

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Besides the traditional heavy-quark observables, like the nuclear modification factor and the elliptic flow, azimuthal correlations of heavy quarks and antiquarks have the potential to give new insight into the interactions with the medium.

Due to the scatterings with the light medium constituents heavy quarks and antiquarks are deflected from their original direction and the initial correlation of the pair is broadened.

We investigate this effect for different transverse momentum classes and find that low-momentum heavy-quark pairs lose their leading order back-to-back initial correlation, while a significant residual correlation survives at large momenta.

In the study of two different energy loss scenarios, purely collisional and collisional plus radiative corrections, which both describe the nuclear modification factor and the elliptic flow, we observe that the purely collisional energy loss is more efficient in broadening the initial correlations.

This discriminatory feature survives when next-to-leading order production processes are included and offers a fascinating possibility to distinguish the different contributions, collisional and radiative, to the heavy-quark in-medium energy loss once experimental results on azimuthal correlations will be available.

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