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Angular two-particle correlations of jet-particles at small momentum scales in an effective model of jet-medium interactions

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Energetic heavy quarks passing through the hot and dense medium of a quark-gluon plasma (QGP), represented by the resulting mesons, are viewed as a suitable probe for the interactions inside of the QGP, in particular the mecha- nisms of energy loss, as they are less likely to thermalize within the medium and are mostly created at early stages of the medium evolution. However, models of both, purely collisional energy loss as well as combinations of collisional and radiative energy loss are equally successful for reproducing the nuclear modifi- cation factor R AA and the elliptic flow v 2 [1]. In an attempt to discriminate between the two different energy-loss mechanisms, an alternative observable, the angular correlations between two mesons were investigated. Azimuthal cor- relations between pairs of heavy mesons, like D- $\bar{D}$ pairs, allow for distinguishing the energy-loss scenarios [2]. We continue these studies by investigating the angular correlations between pairs of heavy and light mesons (D and π), originating from a heavy quark jet. This is motivated by the fact that the emitted gluon in radiative collisions hadronizes and these hadrons are correlated to the emitting heavy quark. We created a Monte-Carlo code for the parton splitting in the vacuum to- gether with an effective medium model. This program represents a consistent framework to study the influences of either collisional or radiative processes on parton propagation, and the resulting two-particle correlations. As experimen- tal data for angular correlations of soft particles has become available [3, 4], we extended our studies to angular correlations of charged particle pairs in various p T ranges and focused particularly on a qualitative understanding of the angular broadening effects at small momentum scales. References [1] P. B. Gossiaux, J. Aichelin, T. Gousset and V. Guiho, J. Phys. G 37 (2010) 094019 [arXiv:1001.4166 [hep-ph]]. [2] M. Nahrgang, J. Aichelin, P. B. Gossiaux and K. Werner, J. Phys. Conf. Ser. 509 (2014) 012047 [arXiv:1310.2218 [hep-ph]]. [3] ALICE Collaboration, Phys. Rev. Lett. 119 (2017) 102301. [4] ALICE Collaboration, Phys. Rev. C96 (2017) 034904.

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