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Jet modification by MPI and determining the characteristic jet size based on multiplicity dependent jet-shape analysis

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High multiplicity events of small colliding systems at high c.m.s. energies show similar collective features as those observed in events

of heavy ion collisions with comparable multiplicities, such as long-range near-side correlations and v_n coefficients [1,2]. Whether this behaviour may be attributed to the presence of a deconfined state in small systems is an open question.

Recent analyses of pp and p-Pb collisions also show an universal enhancement of heavy-flavour particles [3], that is usually attributed to multiple parton interactions (MPI) and higher gluon radiation associated with short distance production processes [4,5]. While we cannot expect to be able to apply hard probes on the medium created in the collisions of small systems, phenomena like MPI or Color reconnection (CR) may cause a modification of the jet shapes that can in principle be experimentally accessible.

We have carried out extensive studies using Monte Carlo event generators. We give predictions for multiplicity-dependent jet structures, and propose a way to validate the presence and extent of effects such as MPI or Color Reconnection, based on the detection of non-trivial jet shape modification in high multiplicity events. We also propose a definition of a characteristic jet size measure that is independent of multiplicity [6].

References:

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