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Exploring jet sub-structure in Pb-Pb and pp collisions with jet shapes in ALICE. (15' + 5')

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The heavy-ion physics program at the LHC aims at characterizing the high energy density, high temperature, deconfined partonic state of matter called Quark-Gluon Plasma.
Hard probes are very useful tools to study the QGP properties since they are abundantly produced at the LHC energy regime, via hard scattering processes, and they experience the full evolution of the system, losing energy while passing through it. Eventually, these processes might also modify the parton fragmentation with respect to the vacuum case.

Jets measurements in Pb-Pb collisions allow to study how the energy is lost by the partons that traverse the medium and redistributed to other particles of the medium.
The characterization of the jet substructure can bring insight on possible modifications induced by the medium. These modifications can be studied using a set of jet shapes like the first order radial momentum, the jet momentum dispersion, the difference between the leading and sub-leading jet tracks and others.
The measurement of these observables in pp collisions is important as QCD test to be compared with theoretical calculations and Monte Carlo generators. Increasing the jet resolutions can also be important to study the influence of the underlying events on the shapes distributions.
The measurement have been also carried out in ALICE in Pb-Pb collisions for jet resolution R=0.2, in order to investigate possible modifications of the jet core, using new techniques for background subtraction and a 2D unfolding procedure to correct the shapes to particles level.

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