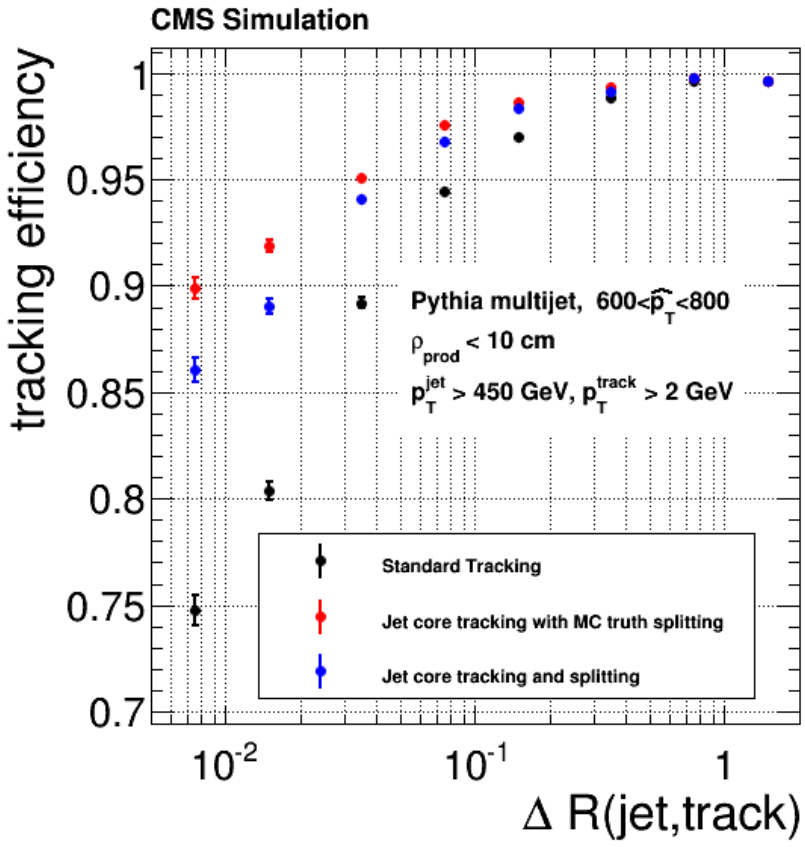
High pt jets tracking

Two new features are being included in track reconstruction addressing the currently low performance of tracking in the core of jets. The first is an additional iterative tracking step targeting the core of jets reconstructed with Et>100 in calorimeters. JetCore tracking starts from seed in a narrow (DeltaR < 0.1) cone around the jet direction, requiring beamline compatibility, high track momentum for pairs of hit in Pixel and/or first two layers of TIB. The pattern recognition is then performed testing in parallel a large number of possibilities (while standard tracking only tests, for speed reasons, a limited number of candidates). The second element is a pixel cluster splitter, for merged pixel clusters, targetting the core of the jets. Such splitter exploit the information of the jet direction to predict the expected cluster shape and charge. The splitter is then based on a k-means like clustering taking into account also the average expected charge per cluster.

Efficiency vs

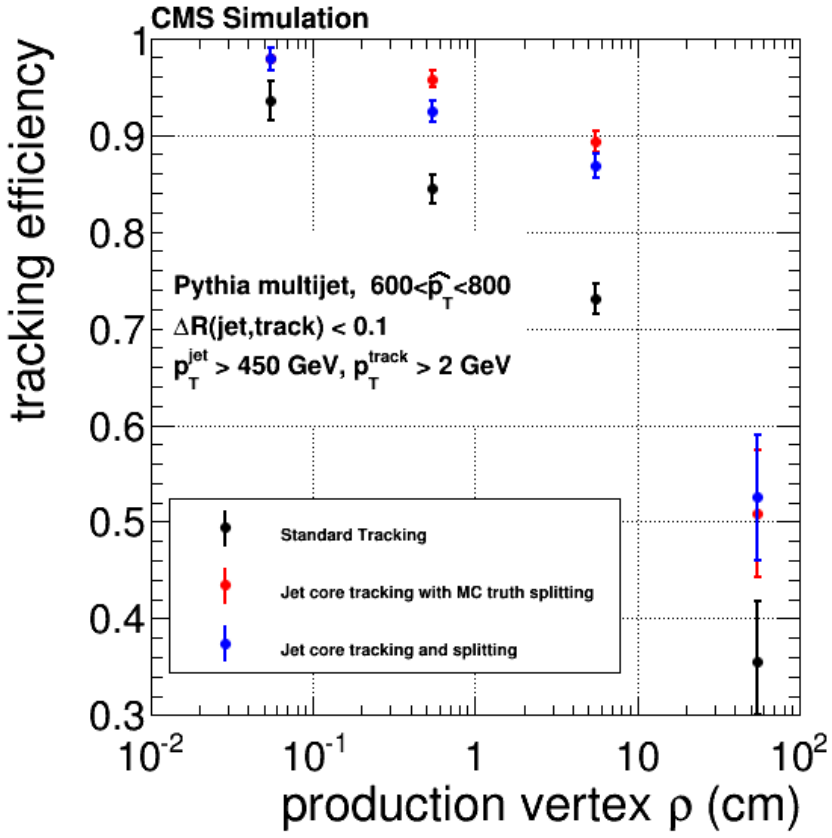
The track reconstruction efficiency as function of the DeltaR between the track and the vertex is computed for different scenarios: standard tracking, jet core tracking with a cluster splitting based on MC truth, and jet core tracking with k-means like splitting. The performances are evaluated on the pythia QCD multi jet sample with pt_hat in range [600,800] selecting only jets with pR > 450 and tracks with pt > 2 GeV. Tracks are in addition required to be produced within 10cm from the beam line.



Efficiency vs production rho

The track reconstruction efficiency as function of the particle production distance from the beamline is compared for three different scenarios: standard tracking, jet core tracking with a cluster splitting based on MC truth, and jet core tracking with k-means like splitting. The performances are evaluated on the pythia QCD multi jet sample with pt_hat in range [600,800] selecting only jets with pR > 450 and tracks with pt > 2 GeV. Tracks are in addition required to be part of the jet core , i.e. they are required to be within DeltaR < 0.1 wrt the jet axis.The left-most point includes all particles with production vertex below 1mm (i.e. including

primaries)



-- AndreaRizzi - 28 Jul 2014

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