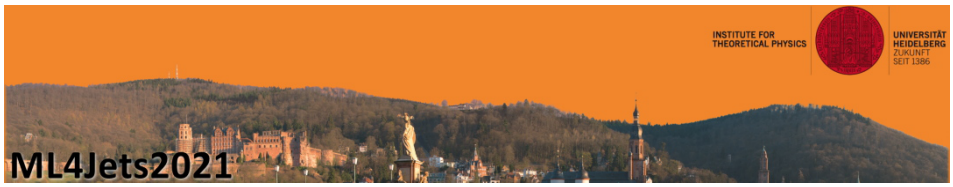

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Machine learning based Particle Flow algorithm and application of super-resolution techniques

Wednesday, 7 July 2021 14:00 (20 minutes)

In High Energy Physics experiments Particle Flow (PFlow) algorithms are designed to provide an optimal reconstruction of the nature and kinematic properties of the particles produced within the detector acceptance during collisions. At the heart of PFlow algorithms is the ability to distinguish the calorimeter energy deposits of neutral particles from those of charged particles, using the complementary measurements of charged particle tracking devices, to provide a superior measurement of the particle content and kinematics. In this presentation, a computer vision approach to this fundamental aspect of PFlow algorithms, based on calorimeter images, is proposed. A comparative study of the state of the art deep learning techniques is performed. A significantly improved reconstruction of the neutral particle calorimeter energy deposits is obtained in a context of large overlaps with the deposits from charged particles. Calorimeter images with augmented finer granularity are also obtained using super-resolution techniques.

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