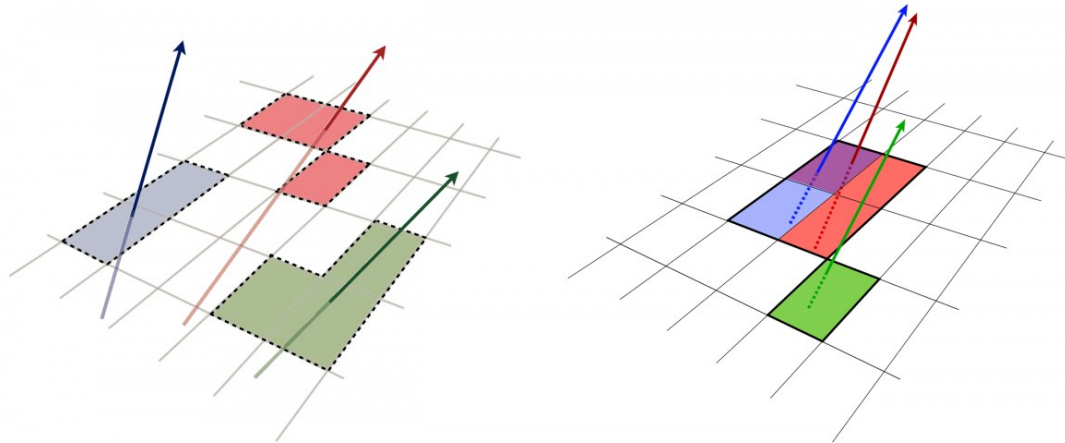# Clustering and Tracking in Dense Environments

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DESY Tracking Meeting
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In a nutshell

> What is CTIDE about?

  – Close-by tracks may share silicon clusters / hits

  – Cluster merging affects

    • Tracking efficiency (shared clusters → penalty at ambiguity solving stage)
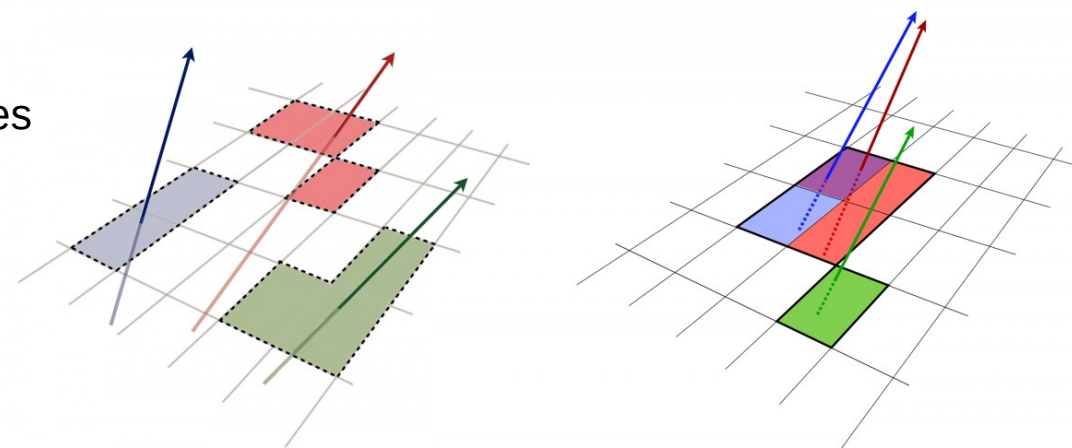
    • Resolution of track parameters, e.g. d0

> Why is it relevant?

  – Dense tracking environments crucial for many physics analyses

   • E.g. boosted h→ bbar decays

    • Top quark decays

    • …

> Goal: measure and improve CTIDE performance

  – Both for Run 3 and HL-LHC

> Software framework: https://gitlab.cern.ch/Atlas-Inner-Tracking/CTIDEefficiency/

> Charged-to-total momentum ratio in a jet: $r_{track} = sum(p_{T,track}) / p_{T,jet}$

  – Independent of jet pT at particle level (e.g. 2/3 for jets composed only of pions)

  – Detector effects, in particular cluster and track merging introduces pT dependence
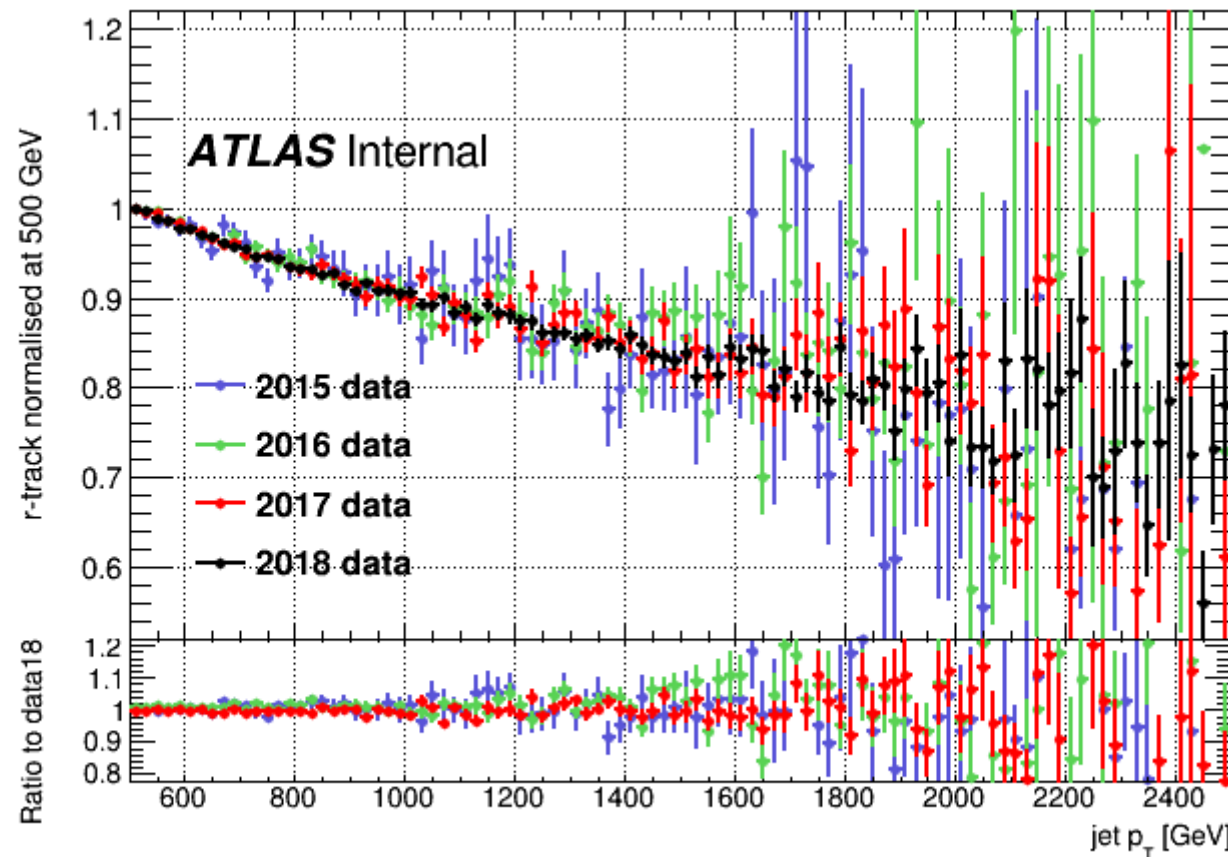
First look at reprocessed data

Many runs still missing, especially for 2015, 2016, 2017

Other measurements (zeta, dEdx) on reprocessed data on-going