

Fast tracking for the HL-LHC ATLAS detector

- HL-LHC will provide up to **200 pile-up**
 - Current Inner Detector (ID) built for $\langle\mu\rangle \lesssim 23$
 - ATLAS will install appropriate tracking detector ITk
- First CPU extrapolations showed a challenge for tracking
 - ITk together with adapted SW achieve significant improvement
- Prototype study for **Fast Track Reconstruction**
 - CPU oriented optimisation of classical tracking
 - Mostly based on modifications of existing reconstruction workflow
 - **8x** faster for ITk, $\langle\mu\rangle=200$ vs. ID, $\langle\mu\rangle=60$
 - Tracking is **not** dominating Phase 2 CPU consumption
 - Achieved performance:
 - Mostly in good agreement with default reconstruction
 - Reduced efficiencies and some parameter resolutions worsened
 - Consequence of applied modifications/approximations → Sources are understood!
 - Improvements in physics performance **required for offline reconstruction**
- **Acts** will be essential for Phase 2 physics performance
 - Provides R&D platform for track reconstruction algorithms
 - Beneficial to **all reconstructions** (e.g. μ , e/γ , b-tagging,...)
 - Has to provide required physics performance

