The ATLAS FTK system
how to improve the physics potential with a tracking trigger

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The Fast TrackKer (FTK) : Motivation and Concept

- **Motivation**
  - In LHC Run2 and Run3 (2015 - 2022), up to 80 overlapping pp collisions per bunch crossing are anticipated.
  - High Level Trigger (HLT) tracking will become difficult and time consuming, due to large number of combinatorials posed by charged particles.

- **Concept of FTK functionality**
  - FTK is a highly-parallel hardware system that rapidly finds and reconstructs high quality tracks in the inner-detector before the start of the High Level Triggers (HLT) processing. The FTK tracks can be utilized for instance for tau and b-jet identifications, either directly or by refitted.

- **Concept of FTK functionality**
  - FTK performs a fast tracking for every event that passes the Level-1 trigger at a maximum event rate of 100kHz.
  - The fast tracking is achieved by "Track Finding" and "Track Fitting".

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**Expected gain in physics channel**

- **Summary**
  - FTK provides all track information for any event accepted by Level-1 trigger.
  - FTK has a potential to improve various physics performance -- Primary Vertex Finding, tau-ID, B-tagging...
  - We can achieve more signal efficiency while rejecting more QCD multijet background.

  A part of FTK will be installed late 2015, full coverage 2016.

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