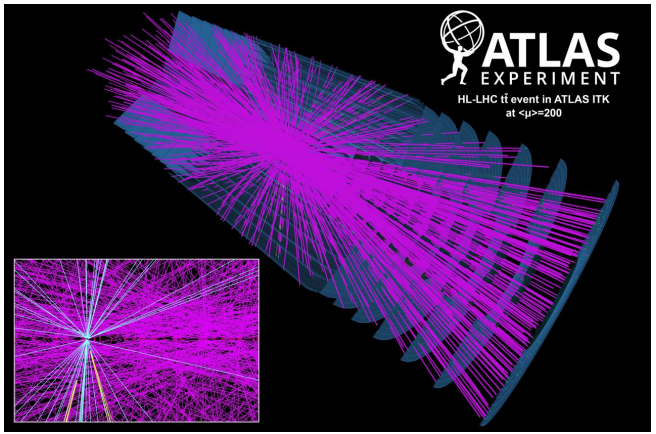
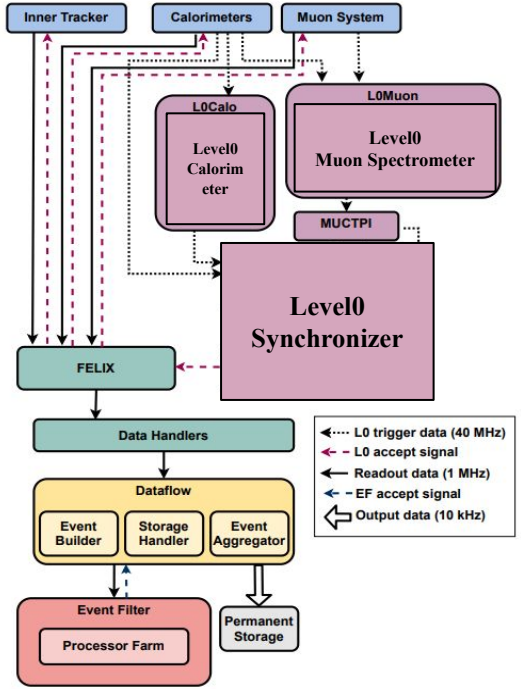
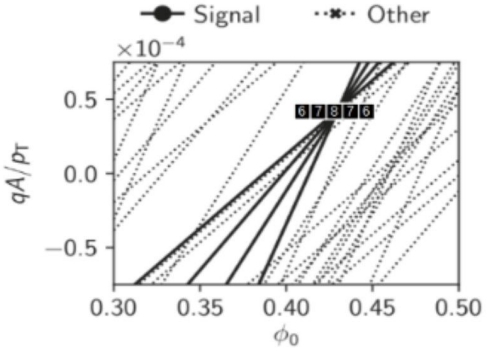
Flexible Hough Transform FPGA Implementation for the ATLAS Event Filter. F. Alfonsi (INFN Italy)





- Number of simultaneous collisions (pile-up) per bunch crossing of 140-200. Peak luminosity is planned to reach 5-7.5 x 10^{34} cm^{-2} s^{-1}
- 10 kHz of output data stream
- Proposed solution: hardware accelerator to filter ITk hits: **Event Filter Tracking**;

Hough Transform implementation results



- Alveo U250 AMD accelerator card with ~20 % of resources occupied;
- Running frequency of 400 MHz;
- Processing time per event: < 5 μs;
- truth tracks preliminary performance in ϕ [0.3:0.5] rad;

Region η	μ	π
0.1 - 0.3	> 96.5 %	> 90 %
0.7 - 0.9	> 97 %	> 82 %