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The ATLAS Jet Trigger Software and Performance for LHC Run 2

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The new centre of mass energy and high luminosity conditions during Run 2 of the Large Hadron Collider impose ever more demanding constraints on the ATLAS online trigger reconstruction and selection system. To cope with these conditions, the hardware-based Level-1 trigger now includes a Topological Processor and the software-based High Level Trigger has been redesigned, merging the two previously separate Level-2 and Event Filter steps. In the new joint software processing level, algorithms run in the same computing nodes, thus sharing resources, minimizing the data transfer from the detector buffers and increasing the algorithm flexibility.

The selection of events containing jets is uniquely challenging at a hadron collider where nearly every event contains significant hadronic activity. It is, however, of crucial importance to explore many physics topics in the new kinematic regime. The ATLAS Jet Trigger software was mostly rewritten to adapt to the new High Level Trigger, while taking into account past experience from Run 1. The upgraded system profits from a much greater re-use of the precise but costly offline software base, a more robust configuration infrastructure, and two alternative schemes for reading the whole or part of the calorimeter data in real time. This presentation will describe the upgraded ATLAS Jet Trigger, detailing some of its design choices, and will show the first trigger results from real Run 2 data.

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