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The development of a general purpose Processing Unit for the upgraded electronics of the ATLAS detector Tile Calorimeter

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Abstract content
   (Max 300 words)
Formatting &
Special chars

Modern Big Science projects such as the Large Hadron Collider at CERN generate enormous amounts of raw data which presents a serious computing challenge. After planned upgrades in 2022, the data output from the ATLAS Tile Calorimeter will increase by 200 times to over 40 Tb/s! ARM processors are common in mobile devices due to their low cost, low energy consumption and high performance. It is proposed that a cost-effective, high data throughput Processing Unit (PU) can be developed by using several consumer ARM processors in a cluster configuration to allow aggregated processing performance and data throughput while maintaining minimal software design difficulty for the end-user. This PU could be used for a variety of high-level functions on the high-throughput raw data such as spectral analysis and histograms to detect possible issues in the detector at a low level. High-throughput I/O interfaces are not typical in consumer ARM System on Chips but high data throughput capabilities of greater than 20 Gb/s per PU is feasible via the novel use of PCI-Express as the I/O interface to the ARM processors. An overview of the PU is given and the results for performance and throughput testing of Freescale Semiconductor i.MX6 quad-core ARM Cortex-A9 processors are presented.

Apply to be
 considered for a student
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Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

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Would you like to <br> submit a short paper <br> for the Conference
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Yes

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