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The Performance of AMS Offline Software on IBM Blue Gene/Q Architecture

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The Alpha Magnetic Spectrometer (AMS) on board of the International Space Station (ISS) requires a large amount of computing power for data production and Monte Carlo simulation. Recently the AMS Offline software was ported to IBM Blue Gene/Q architecture. The supporting software/libraries which have been successfully ported include: ROOT 5.34, GEANT4.10, CERNLIB, and AMS offline data reconstruction and simulation software. The operating system on IBM Blue Gene/Q computing nodes is Compute Node Kernel (CNK) on which there is no Linux shell and only a limited set of system calls are supported. A system shell wrapper class is implemented to support the existing shell command calls in the code. To support standalone simulation jobs running on computing nodes, an MPI emulator class is designed to initialize, get arguments, read data cards, start simulation threads, and finally finalize with coordination across all the jobs within the submission to achieve the best use of CPU time. The AMS
offline software as well as the supporting software/libraries have been built and tested in JUQUEEN computing center in Juelich, Germany. The performance of the AMS offline software on IBM Blue Gene/Q architecture is presented.

Tertiary Keyword (Optional)

Parallelization

Secondary Keyword (Optional)

High performance computing

Primary Keyword (Mandatory)

Software development process and tools

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