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II - Event reconstruction in Modern Particle Physics

Wednesday 2 March 2016 09:00 (1 hour)

Particle physics experiments have always been at the forefront of big data experiments: the upgrade of the LHCb experiment will lead to data rates greater than 10Tb's per second! This is key to the success of high-energy physics, where large data samples, sophisticated triggers and robust simulations have led to observing and understanding extremely rare events, including the Higgs Boson. Continuously, physicists are revisiting computing and electronics decisions to balance the differences between the quality and quantity of physics results, computing effort and available budgets. By drawing on examples of modern particle physics experiments, these lectures will consider the various approaches to tackle such large particle physics data problems:

- Data reduction at the hardware level, including triggers.
- Principles and optimizations of reconstruction algorithms.
- Parallelized reconstruction, including sub processing vs. multithreading.

These topics will be introduced in order, beginning with raw data output from these large experiments, passing through the different stages of data reconstruction and reduction, leading to examples of physics results. The lecture series will end with an outlook to future technologies and the associated physics.

Presenter: SAUNDERS, Daniel Martin (University of Bristol (GB))