Ciclo si seminari:

Parallel scientific computing for analysis and processing of HEP data

di Danilo Piparo (CERN)
12-13 Novembre, 19-20 Novembre

12 Novembre:

1) **The 6th ROOT release cycle**
- Architectural overview from 10.000 kilometres
- The new capabilities of ROOT, support and synergy with modern C++
- The ROOT packages: Graphics, Histogram, Reflection and I/O, Math, RooFit/Stats

13 Novembre:

2) **Parallelism everywhere**
- Types of parallelism: data and task parallelism
- The problem of data dependencies
- Elements of vectorisation: hardware, compilers, libraries and software
- Elements of task oriented models: hardware
- Characterisation of parallelism examples in HEP computation

19 Novembre:

3) **Expressing parallelism pragmatically**
- Support for asynchronous execution in the C++ language
- Threading in C++
- The thread pool model
- Elements of message passing
- Elements of functional programming

20 Novembre:

4) **Resource protection and thread safety**
- The problem of synchronisation
- Elements of design principles aiming to limit contention
- Replication, atomicity, transactions and locks
- Elements of lock-free data structures
- Tools for debugging and profiling mt applications

Appendix: expressing parallelism with the ROOT toolkit (if time allows)
- Tools for debugging and profiling mt applications
- Ok: what is thread safe?
- Parallel analysis: threads controlled by the user, proof-lite