**PhD Physics course at Bari University ( XXXIV Cycle)**

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| **Title** | Introduction to Parallel Computing on multi- and many-cores architectures |
| **Proponent** | Dr. Felice Pantaleo (CERN) |
| **# CFU**  **(1 CFU = 8 hours)** | 2 CFU (16 hours) |
| **Schedule** | June 2019 |
| **Brief Summary of the course** | While the computing community is racing to build tools and libraries course to ease the use of heterogeneous parallel computing systems, effective and confident use of these systems will always require knowledge about the low-level programming interfaces in these systems.  This course is designed to introduce through examples and hands-on exercises, based on Intel TBB and NVIDIA CUDA , the abstractions that make the foundations of parallel and heterogeneous programming  •Task-based parallelism  •Thread hierarchy  •Synchronization  •Memory hierarchy/Shared Memory |
| **Programme** | Moore’s Law, Power wall mitigation, Embarrassingly parallel problems, Flynn's Taxonomy, Contention, Data Hazards, Amdahl's Law (4 hours)  2) Parallel computing architectures, Parallel computing on multi-cores CPUs using TBB (4 hours)  3) Heterogeneous computing, Throughput, CUDA, Memory Hierarchy, Threads Hierarchy, CUDA  Kernel development, Memory Management (8 hours) |
| **Recommended texts** | Material provided by the lecturer |
| **Assessment methods** | Theory introduction with hands-on exercises. |