February 22nd, 2018

Optimization of lattice based simulations for modern HPC architectures

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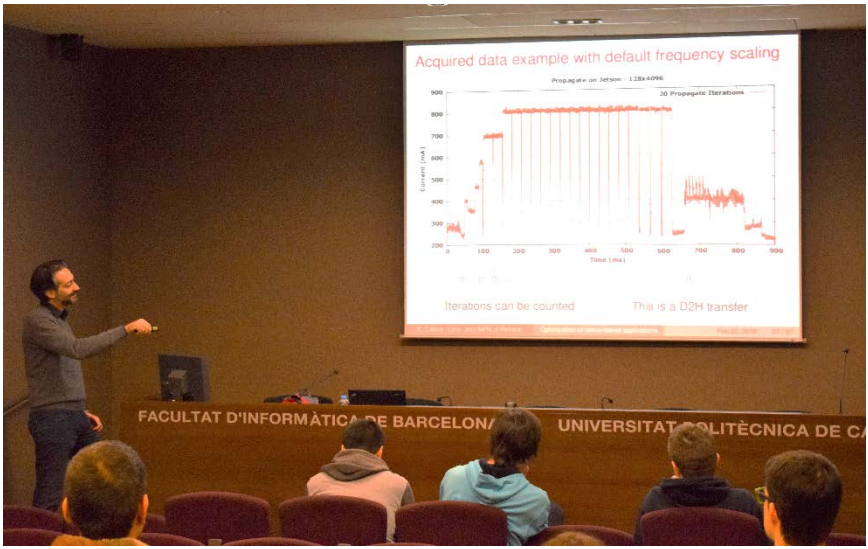
Abstract

In this presentation, we will introduce the activities currently ongoing at the University of Ferrara and INFN Ferrara, concerning the development end optimization of lattice-based scientific applications, targeted to HPC heterogeneous machines.

The talk will focus mainly on a Lattice Boltzmann and a Lattice QCD Monte Carlo simulation codes, discussing the most relevant strategies and methods adopted to implement, analyse and optimize the applications in order to exploit a large fraction of the peak performance on various target processors and accelerators. Particular attention will be drawn to energy-efficiency aspects and future works.



Short bio

Enrico Calore received his BSc and MSc in Computer Engineering from the University of Padua, respectively in 2006 and 2010. In the meanwhile, he had been a technical fellow, and later an undergraduate research fellow, at the Legnaro National Laboratories (LNL) of the Italian National Institute of Nuclear Physics (INFN). In 2014 he received his PhD in Computer Science from the University of Milan and later, he went back to INFN, in the Ferrara branch, as a postdoctoral researcher, where he has worked on the development and optimization of computational physics codes for HPC architectures. At the moment, he is a postdoctoral researcher at the University of Ferrara and an INFN associate. He is working in the HPC field and his main interests are focused on parallel and distributed computing, application performance analysis and code optimizations towards performance and energy-efficiency.