Contribution ID: **3** Type: **Talk**

QCDGPU: an open-source OpenCL tool for Monte Carlo lattice simulations on heterogeneous GPU cluster

Wednesday, 10 September 2014 15:00 (30 minutes)

A new open-source tool QCDGPU for Monte Carlo lattice simulations of the SU(N) gluodynamics and O(N) models is developed. In particular, the package allows to study vacuum dynamics in external chromomagnetic fields, spontaneous vacuum magnetization at high temperature in the SU(N) gluodynamics and other new phenomena. The QCDGPU code is implemented in the OpenCL environment and tested on different OpenCL-compatible devices. It supports single- and multi-GPU modes as well as MPI-ready GPU clusters. Built-in microbenchmarks provide adaptive performance autotuning and effective task scheduling among computing devices in very heterogeneous clusters. Also, the QCDGPU has a client-server part for distributed simulations over VPN. The core of Monte Carlo procedure is based on the PRNGCL library, which contains implementations of the most popular pseudo-random number generators. The package supports single-, mixed- and full double-precision including pseudo-random number generation. The current version of the QCDGPU is available at https://github.com/vadimdi/QCDGPU.

Primary author: Dr DEMCHIK, Vadim (Dnipropetrovsk National University)

Co-author: KOLOMEYETS, Natalia (Dnipropetrovsk National University)

Presenters: KOLOMEYETS, Natalia (Dnipropetrovsk National University); Dr DEMCHIK, Vadim (Dnipropetrovsk National University)

Session Classification: GPU in Lattice QCD