



Contribution ID: 251

Type: **Poster**

## CL2QCD - Lattice QCD based on OpenCL

*Tuesday, 24 June 2014 18:10 (2 hours)*

In recent years it has been shown that Lattice QCD (LQCD) can benefit enormously from Graphic Processing Units (GPUs), which are well suited for memory bandwidth limited applications. Accordingly, the usage of GPUs in LQCD simulations is still expanding, mainly relying on CUDA, applicable to NVIDIA hardware only. A hardware vendor independent approach is given by the Open Computing Language (OpenCL).

We present CL2QCD, a LQCD software based on OpenCL, which has been successfully used for non-zero temperature studies on AMD based clusters. While all mathematical operations are performed in OpenCL, the program logic and the hardware management is carried out in C++. This allows for a clear separation of concerns and, in particular, for a clear distinction of high and low level functionality. Several physical applications have been developed, in this contribution we will focus on the HMC implementation for Wilson and twisted mass Wilson fermions as well as the RHMC for staggered fermions and their performance. In addition we will delve into the concept of unit tests and how it can be applied to LQCD.

**Primary authors:** Mr SCIARRA, Alessandro (Goethe University, Frankfurt am Main); Mr PINKE, Christopher (Institute for Theoretical Physics, Goethe-University Frankfurt am Main); Mr BACH, Matthias (FIAS, Frankfurt am Main); Prof. PHILIPSEN, Owe (Goethe University, Frankfurt am Main)

**Presenters:** Mr SCIARRA, Alessandro (Goethe University, Frankfurt am Main); Mr PINKE, Christopher (Institute for Theoretical Physics, Goethe-University Frankfurt am Main)

**Session Classification:** Poster session

**Track Classification:** Algorithms and Machines