PhD Position: Advanced control for ultra fast X-ray imaging with GPU-clusters

Scientific Context
A new Imaging beamline at KITs synchrotron ANKA is dedicated to the investigation of structures in materials and organisms with a high spatial and temporal resolution. The imaging station consists of an X-ray optical system, a high-precision mechanical system and a set of high-speed cameras producing hundred thousands frames per second and a data rate of up to several GB/s. To operate this beamline, an intelligent fast control and data management system is required. The control system finally will server as a prototype for a new generation of high-speed and high-throughput beamlines in the synchrotron community.

Subject Description
The goal of this work is to build a beamline control system managing the data flow from the camera to the storage. One important aspect are image-driven control loops that have to be optimized for execution on a GPU cluster with Infiniband interconnect. The control system has to be integrated with the Large-Scale-Data-Facility (LSDF) at the KIT supercomputer center and provide visual navigation through the peta-scale archives of the recorded data. The work is embedded in national and international collaborations for high data-rate processing.

Qualification: Master in Computer Science, Mathematics or Physics

Required Skills: Strong C and Python knowledge, parallel computing architectures, numerical algorithms in image processing, 3D visualization techniques, control theory

Conditions: The anticipated duration of the PhD is 3 years with a gross income of around 30,000 EUR per annum.

Application Deadline: August 31, 2013

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