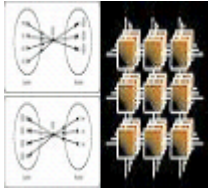


# Wissenschaftliche Mitarbeiter und Studentische Hilfskräfte gesucht! (März 2007)

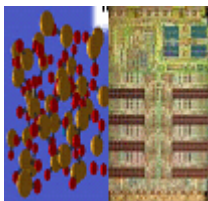
*In Kooperation mit IBM Center of Advanced Study*

## Petaflop Computing - The Next Generation



### High-speed Network Interface with Collective Operation Support for Cell BE (NICOLL)

The Cell's heterogeneous multi-core implementation including its three level software-controlled memory hierarchy has tremendous potential for HPC environments. Clustering Cell's for performance aggregation requires low-latency and high-bandwidth network interface controllers (NIC). Moreover, for extreme scaling NICs are needed that support collective communication operations highly efficient. Whereas message-passing style communication has well proven its potential in massive-parallel environments there is still an ongoing research on how to couple NICs to fit best the HW-SW infrastructure of multi-core processing nodes. Competing concepts of protocol offloading have to be reevaluated in heterogeneous multi-core architectures like Cell BE, especially if Cell is deployed as an accelerator to conventional processors in hybrid systems.



### Analysing Abinit on Cell Clusters (AbiCell)

The Cell BE is a new processor architecture. In order to obtain the maximum performance, it is necessary to adapt the code to match the underlying hardware architecture. This means addressing issues of vectorization, memory alignment and communication between main memory and local stores. Additionally, in case of Cell clusters communication performance issues between interconnected nodes need to be considered too. The goal of this project is to study the performance potential of InfiniBand connected Cell clusters by implementing selected parallel compute kernels of Abinit, a widely used open source code for ab initio electronic structure calculations.

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<http://www.tu-chemnitz.de/informatik/RA/>