

## Information Science and Technology Seminar Series



Lars Koesterke  
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### "The Future of High Performance Computing for Physicists/Astrophysicists"

Wednesday, May 23, 2012

3:00 - 4:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

**Abstract:** With the advent of GPU accelerators the landscape of High Performance Computing has started to change rapidly. While this is in principle good news, the increased compute power comes with a steep price tag in that new languages (CUDA, OpenCL) must be used. Recently Intel has announced their own coprocessor Many Integrated Cores (MIC) technology which will deliver competitive performance but will be programmed through familiar languages (Fortran, C/C++ and OpenMP).

In my talk I will introduce Intel's MIC architecture and will discuss the ongoing efforts at the Texas Advanced Computing Center to build a 10 PetaFlop cluster with MIC coprocessors in early 2013. Coprocessors (MIC) and accelerators (GPU) are here to stay and the changing hardware will spur considerable changes in general software design. Physics/Astrophysics codes of all varieties (highly parallel simulations, software operating on large datasets, etc.) will have to adapt to the new environment. I will discuss software design, performance considerations, and optimizations in general and specifically with respect to the MIC technology.

In the second part of my talk I will introduce the software package ASSET (Advanced Spectral Synthesis 3D Tool) that allows for the fast and efficient calculation of spectra from 3D hydrodynamical models and will highlight my efforts to port the code onto the MIC coprocessors.

**Biography:** Lars Koesterke received his Ph.D. in Physics from the University of Kiel (Germany) in 1993. Koesterke joined Texas Advanced Computing Center (TACC) in 2007 as a Research Associate in the High Performance Computing group. Before coming to TACC, he held positions at the Astronomy Department at The University of Texas at Austin, NASA's Goddard Space Flight Center and the Universities of Potsdam and Kiel (both Germany). His work at TACC is focused on performance evaluation and optimization.