

Contents

HICFD: Highly Efficient Implementation of CFD Codes for HPC Many-Core Architectures	1
Achim Basermann, Hans-Peter Kersken, Andreas Schreiber, Thomas Gerhold, Jens Jägersküpper, Norbert Kroll, Jan Backhaus, Edmund Kügeler, Thomas Alrutz, Christian Simmendinger, Kim Feldhoff, Olaf Krzikalla, Ralph Müller-Pfefferkorn, Mathias Puetz, Petra Aumann, Olaf Knobloch, Jörg Hunger, and Carsten Zscherp	
Effective Holistic Performance Measurement at Petascale Using IPM	15
Karl Furlinger, Nicholas J. Wright, David Skinner, Christof Klausecker, and Dieter Kranzlmüller	
The J-Cell Project: Developing a Scalable and Robust Runtime Environment for Heterogeneous Many-Core Processors	27
Thomas Fuhrmann	
Pre-Stack PRO: A High-Performance Seismic Data Processing Solution	39
Tobias Götz and Alexander Neundorf	
A New Scalable Monitoring Tool Using Performance Properties of HPC Systems	51
Carla Guillen, Wolfram Hesse, and Matthias Brehm	
Design and Implementation of Distributed Meshes in HiFlow	61
Staffan Ronnås, Thomas Gengenbach, Eva Ketelaer, and Vincent Heuveline	
Static and Dynamic Properties of Curved Vapour-Liquid Interfaces by Massively Parallel Molecular Dynamics Simulation	73
M.T. Horsch, S.K. Miroshnichenko, J. Vrabec, C.W. Glass, C. Niethammer, M.F. Bernreuther, E.A. Müller, and G. Jackson	

Score-P: A Unified Performance Measurement System for Petascale Applications	86
Dieter an Mey, Scott Biersdorf, Christian Bischof, Kai Diethelm, Dominic Eschweiler, Michael Gerndt, Andreas Knüpfer, Daniel Lorenz, Allen Malony, Wolfgang E. Nagel, Yury Oleynik, Christian Rössel, Pavel Saviankou, Dirk Schmidt, Sameer Shende, Michael Wagner, Bert Wesarg, and Felix Wolf	
Parallelization of an Edge- and Coherence-Enhancing Anisotropic Diffusion Filter with a Distributed Memory Approach Based on GPI	99
Martin Kühn	
eeClust: Energy-Efficient Cluster Computing	111
Timo Minartz, Daniel Molka, Michael Knobloch, Stephan Krempel, Thomas Ludwig, Wolfgang E. Nagel, Bernd Mohr, and Hugo Falter	
An Efficient and Flexible Parallel FFT Implementation Based on FFTW	125
Michael Pippig	
ParaSCIP: A Parallel Extension of SCIP	135
Yuji Shinano, Tobias Achterberg, Timo Berthold, Stefan Heinz, and Thorsten Koch	
High-Performance Computing Techniques for Coupled Fluid, Structure and Acoustics Simulations	149
Dörte C. Sernel, Michael Kornhaas, and Michael Schäfer	
LIKWID: Lightweight Performance Tools	165
Jan Treibig, Georg Hager, and Gerhard Wellein	
Scalability Issues of In-Situ Visualization in Parallel Simulation of Unsteady Flows	177
Michael Vetter and Stephan Olbrich	
Towards Intelligent Management of Very Large Computing Systems	191
Eugen Volk, Jochen Buchholz, Stefan Wesner, Daniela Koudela, Matthias Schmidt, Niels Fallenbeck, Roland Schwarzkopf, Bernd Freisleben, Götz Isenmann, Jürgen Schwitalla, Marc Lohrer, Erich Focht, and Andreas Jeutter	
Parallel Multigrid Methods and Coarse Grid LDL^T Solver for Maxwell's Eigenvalue Problem	205
Daniel Maurer and Christian Wieners	

Scaling Algebraic Multigrid Solvers: On the Road to Exascale 215
Allison H. Baker, Robert D. Falgout, Todd Gamblin, Tzanio V.
Kolev, Martin Schulz, and Ulrike Meier Yang

**Radiation Hydrodynamics Code LARED-H for Laser Fusion
Simulation**..... 227
Zeng Qinghong, Pei Wenbing, Cheng Juan, Yong Heng, and Zhai
Chuanlei