

Dipl.-Ing. Lukas Einkemmer, PhD MSc BSc

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Education

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| 2011–2014 | PhD in applied mathematics
University of Innsbruck, University of California Merced (research stay)
graduation with excellent success |
| 2010–2011 | Dipl.-Ing. in applied mathematics
University of Innsbruck
graduation with excellent success |
| 2010–2013 | MSc in physics (theoretical quantum physics)
University of Innsbruck |
| 2007–2010 | BSc in applied mathematics
University of Innsbruck, University of New Orleans (joint study program)
graduation with excellent success |
| 2007 | English language training school
Boston, United States of America |
| 2001–2006 | Higher Technical Institute in electrical engineering
HTL Anichstraße, Innsbruck
graduation with excellent success |
| 1997–2001 | Grammar school, BG/BRG Sillgasse, Innsbruck |
| 1992–1997 | Elementary school, Völs |

Prizes & Awards

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| 2016 | Prize of the state capital Innsbruck for scientific research |
| 2015 | SciCADE New Talent Award |
| 2014 | Oberwolfach Leibniz Graduate Student |
| 2013 | Heidelberg Laureate Forum |
| 2013 | Appreciation award of the federal minister for science |
| 2013 | Marshall Plan Scholarship |
| 2007–2014 | Achievement based scholarship of the University of Innsbruck |
| 2012 | PhD scholarship of the University of Innsbruck |
| 2012 | Master theses supported by the Science fund of the Tiroler Landesregierung |
| 2008 | Joint study scholarship |

Research projects

2016	Exponential integrators for problems in magnetohydrodynamics Nachwuchsförderung 2016
2016	New methods for the solution of the inhomogeneous Vlasov equation Co-author, Friedrich Schiedel Stiftung für Energietechnik
2015	Exponential integrators for modern many-core architectures Co-author, TWF project
2014	High-resolution numerical schemes for hyperbolic conservation laws, and their performance on modern HPC architectures Co-author, VSC school project
2014	Splitting Methods for the Vlasov-Poisson and Vlasov-Maxwell Equations One million core-hours on the VSC-2
2013	Splitting methods for the Vlasov-Poisson and Vlasov-Maxwell equations Co-author, FWF project

Employment

Since 2016	University of Innsbruck Tenure track position
2014–2015	University of Innsbruck/Austrian Science Fund (FWF) Postdoctoral researcher
2013–2014	University of Innsbruck/Austrian Science Fund (FWF) PhD position
2009–2013	University of Innsbruck, Institute of Mathematics Teaching position
2011	Bartenbach GPGPU training
2010	University of Innsbruck Project collaboration (Java applets)
2006–2007	Austrian Red Cross Civil service
2003–2005 (Summer)	World-Direct.at eBusiness Solutions GmbH Web programming

International examinations

TOEFL	113 of 120 points
SAT	Critical Reading: 640 of 800 points Math: 720 Writing: 610
SAT Subject	Math Level 1: 760 of 800 points Math Level 2: 760 Physics: 780

Misc

Since 2011	Member of the association of American football officials in Austria
2011	21st Vojtech Jarnik International Mathematical Competition Ostrava
2010	17th International Mathematics Competition (honorable mention) Blagoevgrad
2009	16th International Mathematics Competition (honorable mention) Budapest

Publications

- Papers
- M. Gasteiger, L. Einkemmer, A. Ostermann, and D. Tskhakaya. ADI type preconditioners for the steady state inhomogeneous Vlasov equation. *To appear in J. Plasma Phys.*, 2016
- L. Einkemmer, M. Tokman, and J. Loffeld. On the performance of exponential integrators for problems in magnetohydrodynamics. *J. Comput. Phys.*, 330:550–565, 2017
- M. Prugger, L. Einkemmer, and A. Ostermann. Evaluation of the Partitioned Global Address Space (PGAS) model for an inviscid Euler solver. *Parallel Comput.*, 60:22–40, 2016
- L. Einkemmer and A. Ostermann. Overcoming order reduction in diffusion-reaction splitting. Part 2: oblique boundary conditions. *SIAM J. Sci. Comput.*, 38(6):A3741–A3757, 2016
- N. Crouseilles, L. Einkemmer, and E. Faou. An asymptotic preserving scheme for the relativistic Vlasov–Maxwell equations in the classical limit. *Comput. Phys. Commun.*, 209:13–26, 2016
- L. Einkemmer. Structure preserving numerical methods for the Vlasov equation. *Oberwolfach Reports, No. 18/2016*, 2016
- L. Einkemmer. A mixed precision semi-Lagrangian algorithm and its performance on accelerators. *High Performance Computing and Simulation (HPCS), International Conference on*, 2016
- L. Einkemmer. A modern resistive magnetohydrodynamics solver using C++ and the Boost library. *Comput. Phys. Commun.*, 206:69–77, 2016
- L. Einkemmer. High performance computing aspects of a dimension independent semi-Lagrangian discontinuous Galerkin code. *Comput. Phys. Commun.*, 202:326–336, 2016
- L. Einkemmer and A. Ostermann. A splitting approach for the Kadomtsev–Petviashvili equation. *J. Comput. Phys.*, 299:716–730, 2015
- L. Einkemmer and A. Ostermann. Overcoming order reduction in diffusion-reaction splitting. Part 1: Dirichlet boundary conditions. *SIAM J. Sci. Comput.*, 37(3):A1577–A1592, 2015
- L. Einkemmer, Z. Vörös, G. Weihs, and S. Portolan. Polarization entanglement generation in microcavity polariton devices. *Phys. Status Solidi (b)*. DOI: 10.1002/pssb.201451704, 2015
- L. Einkemmer and A. Ostermann. On the error propagation of semi-Lagrange and Fourier methods for advection problems. *Comput. Math. Appl.*, 69(3):170–179, 2015
- N. Crouseilles, L. Einkemmer, and E. Faou. A Hamiltonian splitting for the Vlasov–Maxwell system. *J. Comput. Phys.*, 238:224–240, 2015
- L. Einkemmer and M. Wiesenberger. A conservative discontinuous Galerkin scheme for the 2D incompressible Navier–Stokes equations. *Comput. Phys. Commun.*, 185(11):2865–2873, 2014
- L. Einkemmer and Ostermann A. A comparison of triple jump and Suzuki fractals for obtaining high order from an almost symmetric Strang splitting scheme. *Oberwolfach Reports, No. 14/2014*, 2014

- L. Einkemmer and A. Ostermann. A strategy to suppress recurrence in grid-based Vlasov solvers. *Eur. Phys. J. D*, 68:197, 2014
- S. Portolan, L. Einkemmer, Z. Vörös, G. Weihs, and P. Rabl. Generation of hyper-entangled photon pairs in coupled microcavities. *New J. Phys.*, 16:063030, 2014
- L. Einkemmer and A. Ostermann. An almost symmetric Strang splitting scheme for nonlinear evolution equations. *Comput. Math. Appl.*, 67(12):2144–2157, 2014
- L. Einkemmer and A. Ostermann. An almost symmetric Strang splitting scheme for the construction of high order composition methods. *Comput. Appl. Math.*, 271:307–318, 2014
- L. Einkemmer and A. Ostermann. Convergence analysis of a discontinuous Galerkin/Strang splitting approximation for the Vlasov–Poisson equations. *SIAM J. Numer. Anal.*, 52(2):757–778, 2014
- L. Einkemmer and A. Ostermann. Convergence analysis of Strang splitting for Vlasov-type equations. *SIAM J. Numer. Anal.*, 52(1):140–155, 2014
- L. Einkemmer and A. Ostermann. Exponential integrators on graphic processing units. *High Performance Computing and Simulation (HPCS), International Conference on*, 2013
- Preprints L. Einkemmer and A. Ostermann. A semi-Lagrangian discontinuous Galerkin scheme for Burgers’ equation with application to the Kadomtsev–Petviashvili equation. *arXiv:1701.05602*, 2017
- M. Wiesenberger, M. Held, and L. Einkemmer. Streamline integration as a method for two-dimensional elliptic grid generation. *arXiv:1610.07939*, 2016
- L. Einkemmer and A. Ostermann. A comparison of boundary correction methods for Strang splitting. *arXiv:1609.05505*, 2016
- L. Einkemmer. On the geometric properties of the semi-Lagrangian discontinuous Galerkin scheme for the Vlasov–Poisson equation. *arXiv:1601.02280*, 2016
- L. Einkemmer. Evaluation of the Intel Xeon Phi and NVIDIA K80 as accelerators for two-dimensional panel codes. *arXiv:1511.02166*, 2015
- Book chapter L. Einkemmer and A. Ostermann. Splitting methods for the Vlasov–Poisson and Vlasov–Maxwell equations. In M. Barden and A. Ostermann, editors, *Scientific Computing @ wibk*. Innsbruck University Press, 2014
- Theses Splitting methods for the Vlasov–Poisson and Vlasov–Maxwell equations PhD thesis (2014), Advisor: Prof. Alexander Ostermann
- Parametric scattering in microcavities
Master thesis in physics (2013), Advisor: Prof. Gregor Weihs
- Exponential integrators on graphic processing units
Master thesis in mathematics (2011), Advisor: Prof. Alexander Ostermann
- Monte Carlo methods
Bachelor thesis (2010), Advisor: Prof. Alexander Ostermann
- Topics in non-linear differential equations
Bachelor thesis (2009), Advisor: Prof. Norbert Ortner

Conferences & Workshops

Plenary talks	International Conference on Scientific Computing and Differential Equations (SciCADE), 2015
Talks	9th Workshop on the Numerical Analysis of Evolution Equations, 2016
	2nd Geometric Algorithms and Methods for Plasma Physics Workshop (GAMPP), 2016
	The 2016 International Conference on High Performance Computing & Simulation, 2016
	28th IUPAP Conference on Computational Physics (CCP), 2016
	Stability and Discretization Issues in Differential Equations (SDIDE), 2016
	Austrian Numerical Analysis Day, 2016
	Simula research laboratory, 2016
	Oberwolfach workshop on geometric numerical integration, 2016
	Austrian HPC Meeting, 2016
	DK CIM winterschool, 2015
	Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-14), 2015
	Multiscale numerical methods for differential equations (Rennes), 2015
	The 8th International Congress on Industrial and Applied Mathematics (ICIAM), 2015
	The 10th International ISAAC Congress, 2015
	Austrian Numerical Analysis Day, 2015
	Austrian HPC Meeting, 2015
	The 5th International Conference on Scientific Computing and Partial Differential Equations (SCPDE14), 2014
	Seminar, Ecole Normale Supérieure Cachan Bretagne (Rennes), 2014
	Numerical Analysis of Evolution Equations, 8th NAI Workshop, 2014
	International Workshop on Algorithms and Software for Scientific Computing, 2014
	European Finite Element Fair, 2014
	Austrian Numerical Analysis Day, 2014
	Oberwolfach Workshop on Nonlinear Evolution Equations: Analysis and Numerics, 2014
	International Conference on Scientific Computing and Differential Equations (SciCADE), 2013
	European Numerical Mathematics and Advanced Applications (ENUMATH), 2013
	The 2013 International Conference on High Performance Computing & Simulations (HPCS), 2013
	Encounters Between Discrete and Continuous Mathematics, 2013
	Austrian Numerical Analysis Day, 2013

- Workshop Bad Herrenalb, 2013
- Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-13), 2012
- Séminaire exceptionnel (Néel Institute), 2012
- 7th Workshop on Innovative Integrators, 2012
- Posters Fifth International Workshop on the Theory and Applications of the Vlasov equation, Vlasovia 2016
- SIAM Conference on Parallel Processing for Scientific Computing, 2016
- Conference on Computational Physics, CCP2014
- Advances in Nonlinear PDEs: Analysis, Numerics, Stochastics, Applications, 2014
- PRACE Spring School, 2014
- Bay Area Scientific Computing Day, 2013
- The European Conference on Lasers and Electro-Optics (CLEO/Europe), 2013
- Schools Innovative concepts for complexity reduction in numerical PDEs: nonlinear approximation, sparsity, adaptivity, model reduction, Dobiacco summer school, 2015
- Matrix Theory and Computation with Applications to Network Analysis, Quantum Chemistry and Dynamical Systems, Dobiacco summer school, 2014
- PRACE Spring School (invitation only), 2014
- Geometric Integration of Ordinary and Partial Differential Equations, Dobiacco summer school, 2013
- Christmas Colloquium on Gravitational Puzzles, 6th AFI Symposium, 2012
- MPL Autumn Academy (invitation only), Max Planck Institute for the Science of Light, 2012**
- Trends in Scientific Computing, International summer school, 2012