Publications

Dr. rer. nat. Erik Schnetter

Refereed Publications

1. P. Mösta, S. Richers, C. D. Ott, R. Haas, A. L. Piro, K. Boydstun, E. Abdikamalov, C. Reisswig, and E. Schnetter, *Magnetorotational core-collapse supernovae in three dimensions*, Astrophys. J. Lett. **785**, L29 (2014), arXiv:1403.1230 [astroph.HE], URL `http://arxiv.org/abs/1403.1230`.

2. B. Dittrich, M. Martín-Benito, and E. Schnetter, *Coarse graining of spin net models: dynamics of intertwiners*, New J. Phys. **15**, 103004 (2013), arXiv:1306.2987 [gr-qc], URL `http://arxiv.org/abs/1306.2987`.

3. M. Blazewicz, I. Hinder, D. M. Koppelman, S. R. Brandt, M. Ciznicki, M. Kierzynka, F. Löffler, E. Schnetter, and J. Tao, *From physics model to results: An optimizing framework for cross-architecture code generation*, Scientific Programming **21**, 1 (2013), arXiv:1307.6488 [physics.comp-ph], URL `http://arxiv.org/abs/1307.6488`.

4. I. Hinder, A. Buonanno, M. Boyle, Z. B. Etienne, J. Healy, N. K. Johnson-McDaniel, A. Nagar, H. Nakano, Y. Pan, H. P. Pfeiffer, M. Pürrer, C. Reisswig, M. A. Scheel, E. Schnetter, U. Sperhake, B. Szilágyi, W. Tichy, B. Wardell, A. Zenginoglu, D. Alic, S. Bernuzzi, T. Bode, B. Brügmann, L. T. Buchman, M. Campanelli, T. Chu, T. Damour, J. D. Grigsby, M. Hannam, R. Haas, D. A. Hemberger, S. Husa, L. E. Kidder, P. Laguna, L. London, G. Lovelace, C. O. Lousto, P. Marronetti, R. A. Matzner, P. Mösta, A. Mroué, D. Müller, B. C. Mundim, A. Nerozzi, V. Paschalidis, G. R. Denis Pollney and, L. Rezzolla, S. L. Shapiro, D. Shoemaker, A. Taracchini, N. W. Taylor, S. A. Teukolsky, M. Thierfelder, H. Witek, and Y. Zlochower, *Error-analysis and comparison to analytical models of numerical waveforms produced by the NRAR collaboration*, Class. Quantum Grav. **31**, 025012 (2013), arXiv:1307.5307 [gr-qc], URL `http://arxiv.org/abs/1307.5307`.

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6. C. Reisswig, C. D. Ott, E. Abdikamalov, R. Haas, P. Mösta, and E. Schnetter, *Formation and coalescence of cosmological supermassive black hole binaries in supermassive star collapse*, Pyys. Rev. Lett. **111**, 151101 (2013), arXiv:1304.7787 [astro-ph.CO], URL `http://arxiv.org/abs/1304.7787`.

7. C. Reisswig, R. Haas, C. D. Ott, E. Abdikamalov, P. Mösta, D. Pollney, and E. Schnetter, *Three-dimensional general-relativistic hydrodynamic simulations of binary neutron star coalescence and stellar collapse with multipatch grids*, Phys. Rev. D **87**, 064023 (2013), arXiv:1212.1191 [astro-ph.HE], URL `http://arxiv.org/abs/1212.1191`.

8. P. Möesta, B. C. Mundim, J. A. Faber, R. Haas, S. C. Noble, T. Bode, F. Loeffler, C. D. Ott, C. Reisswig, and E. Schnetter, *GRHydro: A new open source general-relativistic magnetohydrodynamics code for the Einstein Toolkit*, Class. Quantum Grav. **31**, 015005 (2014), arXiv:1304.5544 [gr-qc], URL `http://arxiv.org/abs/1304.5544`.

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2. L. Oliker, J. Carter, V. Beckner, J. Bell, H. Wasserman, M. Adams, S. Ethier, and E. Schnetter, *Large-scale numerical simulations on high-end computational platforms*, in *Performance Tuning of Scientific Applications*, edited by D. H. Bailey, R. F. Lucas, and S. W. Williams (Chapman & Hall/CRC Computational Science Series, 2011), chap. 6, URL `http://www.crcpress.com/product/isbn/9781439815694`.

3. E. Schnetter, C. D. Ott, G. Allen, P. Diener, T. Goodale, T. Radke, E. Seidel, and J. Shalf, *Cactus Framework: Black holes to gamma ray bursts*, in *Petascale Computing: Algorithms and Applications*, edited by D. A. Bader (Chapman & Hall/CRC Computational Science Series, 2008), chap. 24, arXiv:0707.1607 [cs.DC], URL `http://arxiv.org/abs/0707.1607`.

Theses

1. E. Schnetter, *Gauge fixing for the simulation of black hole spacetimes*, Ph.D. thesis, Universität Tübingen (2003), arXiv:gr-qc/0411002, URL `http://w210.ub.uni-tuebingen.de/dbt/volltexte/2003/819/`.

2. E. Schnetter, *Untersuchungen zur Implementierung von Strahlungstransport im SPH-Formalismus (*engl.*: Investigations towards implementing radiative transport in the SPH formalism)*, Diplomarbeit (in German), Fakultät für Physik, Universität Tübingen (1998).

Conference Contributions and Technical Reports

1. P. Lunts, S. Bhattacharjee, J. Miller, E. Schnetter, Y. B. Kim, and S.-S. Lee, *Ab initio holography*, Tech. Rep. (2015), arXiv:1503.06474 [hep-th], URL `http://arxiv.org/abs/1503.06474`.

2. E. Schnetter, M. Blazewicz, S. R. Brandt, D. M. Koppelman, and F. Löffler, *Chemora: A PDE solving framework for modern HPC architectures*, Tech. Rep. (2014), arXiv:1410.1764 [cs.MS], URL `http://arxiv.org/abs/1410.1764`.

3. E. Abdikamalov, C. D. Ott, D. Radice, L. F. Roberts, R. Haas, C. Reisswig, P. Moesta, H. Klion, and E. Schnetter, *Neutrino-driven turbulent convection and standing accretion shock instability in three-dimensional core-collapse supernovae*, Tech. Rep. (2014), arXiv:1409.7078 [astro-ph.HE], URL `http://arxiv.org/abs/1409.7078`.

4. F. Löffler, S. R. Brandt, G. Allen, and E. Schnetter, *Cactus: issues for sustainable simulation software*, in *WSSSPE: Working towards Sustainable Software for Science: Practice and Experiences* (2013), arXiv:1309.1812 [cs.CE], URL `http://arxiv.org/abs/1309.1812`.

5. E. Schnetter, *Performance and optimization abstractions for large scale heterogeneous systems in the Cactus/Chemora framework*, Tech. Rep. (2013), arXiv:1308.1343 [cs.DC], URL `http://arxiv.org/abs/1308.1343`.

6. C. D. Ott, E. Abdikamalov, S. Gossan, H. Klion, R. Haas, P. Moesta, C. Reisswig, U. C. T. Gamma, E. O'Connor, and E. Schnetter, *The gravitational-wave signature of core-collapse supernovae*, in *American Physical Society, APS April Meeting 2013, April 13-16, 2013* (2013).

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9. E. Abdikamalov, C. D. Ott, E. O'Connor, C. Reisswig, P. Kalmus, F. Löffler, A. Burrows, S. Drasco, and E. Schnetter, *Gravitational wave and neutrino signals from rotating general-relativistic stellar collapse*, in *American Physical Society, APS April Meeting 2012, March 31-Apr 3, 2012* (2012).

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15. B. Zink, N. Stergioulas, O. Korobkin, E. Schnetter, P. Diener, and M. Tiglio, *Frequencies of nonaxisymmetric F-modes in rapidly rotating polytropes in full general relativity*, in *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, R. T. Jantzen, and R. Ruffini (Singapore: World Scientific, 2012), p. 807.

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21. J. Shalf, E. Schnetter, G. Allen, and E. Seidel, *Cactus as benchmarking platform*, Tech. Rep. CCT-TR-2006-3, Louisiana State University (2007), URL `http://www.cct.lsu.edu/CCT-TR/CCT-TR-2006-3`.

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24. B. Zink, N. Stergioulas, I. Hawke, C. D. Ott, E. Schnetter, and E. Müller, *Rotational instabilities in supermassive stars: a new way to form supermassive black holes*, in *International Scientific Workshop on Cosmology and Gravitational Physics, Thessaloniki, December 15-16, 2005*, edited by N. K. Spyrou, N. Stergioulas, and C. Tsagas (ZITI, Thessaloniki, 2006), pp. 155–160.

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26. E. Schnetter, *A fast apparent horizon algorithm* (2002), arXiv:gr-qc/0206003, URL `http://arxiv.org/abs/gr-qc/0206003`.

27. E. Schnetter, *The Maya project: Simulations of binary black hole systems*, in *The Ninth Marcel Grossmann Meeting. On Recent Developments in Theoretical and Experimental General Relativity, Gravitation and Relativistic Field Theories. Proceedings of the MG9 Meeting* (World Scientific, 2001), vol. 3, pp. 1741–1742.

28. E. Schnetter, S. Kunze, and R. Speith, *Fluid jet simulations using Smoothed Particle Hydrodynamics*, in *High Performance Computing in Science and Engineering 2000*, edited by E. Krause and W. Jäger (Springer, 2001), pp. 99–113.

29. R. Speith, E. Schnetter, S. Kunze, and H. Riffert, *Distributed implementation of SPH for simulations of accretion disks*, in *Molecular Dynamics on Parallel Computers*, edited by R. Esser, P. Grassberger, J. Grotendorst, and M. Lewerenz (World Scientific, 2000), pp. 276–285, proceedings of the Workshop at the John von Neumann-Institut for Computing (NIC), Research Centre Jülich, 8 - 10 February 1999.

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31. S. Kunze, E. Schnetter, and R. Speith, *Development and astrophysical applications of a parallel smoothed particle hydrodynamics code with MPI*, in *High Performance Computing in Science and Engineering '99*, edited by E. Krause and W. Jäger (Springer, 2000), pp. 52–61.

Recent Invited Presentations

1. E. Schnetter, *Chemora: A scalable PDE solving framework for modern HPC architectures* (April 2014), invited talk given at APS April meeting in 2014 in Savannah, GA, USA, URL `http://meetings.aps.org/Meeting/APR14/Session/X11.3`.

2. E. Schnetter, *Architectural considerations for computing in astrophysics* (February 2014), podcast interview by Nicole Hemsoth for HPCwire Soundbites, URL `http://www.hpcwire.com/soundbite/architectural-considerations-computing-astrophysics/`.

3. E. Schnetter, *Adaptive mesh refinement: Current state in Cactus, and future possibilities* (November 2013), invited talk given at SIMAC3 conference in Boston, MA, USA, URL `http://blogs.bu.edu/simac3/`.

4. E. Schnetter, *High performance computing in relativistic astrophysics* (February 2013), invited talk given at Department of Physics & Astronomy, University of Waterloo, ON, Canada.

5. E. Schnetter, *High performance computational relativistic astrophysics* (October 2012), invited talk given at Department of Physics, University of Guelph, ON, Canada.

6. E. Schnetter, *The Einstein Toolkit and its community* (July 2012), invited Talk given at Numerical Cosmology conference in Cambridge, UK, URL `http://www.damtp.cam.ac.uk/research/gr/workshops/NumCos/2012/`.

7. E. Schnetter, *The Einstein Toolkit: From black holes to gamma-ray bursts* (Marcy 2012), invited Talk given at University of Ontario Institute of Technology, Oshawa, ON, Canada.

Recent Contributed Presentations

1. E. Schnetter, *pocl: Portable computing language* (November 2013), talk given in LLVM BoF session at SC2013 in Denver, CO, USA, URL `http://sc13.supercomputing.org/`.

2. E. Schnetter, *Performance and optimization abstractions for large scale heterogeneous systems in the Cactus/Chemora framework* (August 2013), talk given at XSCALE 2013 conference in Boulder, CO, USA, URL `https://www.xsede.org/web/xscale/xscale13`.

3. E. Schnetter, *Modern methods in numerical relativity* (September 2012), talk given at AMS Fall Eastern Sectional Meeting in Rochester, NY, USA, URL `http://www.ams.org/meetings/sectional/2198_program.html`.

4. E. Schnetter, *From physics model to results: An optimizing framework for cross-architecture code generation* (May 2012), talk given at Sharcnet Research Day in Guelph, ON, Canada, URL `https://www.sharcnet.ca/events/RDay2012/`.

Recent Lectures

1. E. Schnetter, *Introduction to numerical relativity* (July 2013), lecture given at CGWAS 2013 summer school in Pasadena, CA, USA, URL `http://www.cgwas.org/index.php/Caltech_Gravitational-Wave_Astrophysics_School_2013`.

2. E. Schnetter, *OpenMP: Open multiprocessing* (May 2013), lecture given at IHCP 2013 summer school in Iowa City, IA, USA, URL `http://newton.physics.uiowa.edu/~ghowes/teach/ihpc13/index.html`.

3. E. Schnetter, *OpenMP: Open multiprocessing* (June 2012), lecture given at IHCP 2012 summer school in Iowa City, IA, USA, URL `http://newton.physics.uiowa.edu/~ghowes/teach/ihpc12/index.html`.