

Ernazar Abdikamalov

Curriculum Vitae

Current Appointment: Assistant Professor of Physics
Physics Department,
School of Science and Technology,
Nazarbayev University (since 08/2014)

Current Address: 53 Kabanbay Batyr Avenue
Astana, Kazakhstan, 010000
Office Phone: +7-7172-69-4662
Cell Phone: +7-777-8800-442
ernazar.abdikamalov@nu.edu.kz
ernazarabdikamalov.com

Academic Degrees **Ph.D. in Astrophysics**
International School for Advanced Studies
Advisors: J. C. Miller, L. Rezzolla
B.S. in Physics (with distinction)
National University of Uzbekistan
Advisor: B. Ahmedov

Previous Positions
05/2014 – 07/2014 Postdoctoral Scholar, Oak Ridge National Laboratory
Oak Ridge National Laboratory, Advisor: Raphael Hix
03/2011 – 04/2014 Postdoctoral Scholar, Theoretical Astrophysics
California Institute of Technology, Advisor: Christian Ott
02/2010 – 02/2011 Postdoctoral Scholar
Center for Computation and Technology
Louisiana State University, Advisor: Erik Schnetter

Education
11/2005 – 11/2009 Graduate Student
International School for Advanced Studies, Italy
09/2001 – 01/2005 B.S. in Physics
National University of Uzbekistan, Uzbekistan

Key scientific achievements:

- Development and implementation of a new efficient, robust, and massively parallel Monte Carlo method for energy-, time-, and velocity-dependent radiation transport (Abdikamalov *et al.* 2012).
- Development of new methods for measuring the angular momentum distribution in core-collapse supernova progenitors with gravitational waves (Abdikamalov *et al.* 2014).
- Three-dimensional high-resolution simulations of core-collapse supernovae in general relativity. New insights on the role of the standing accretion shock instability and neutrino-driven turbulent convection (Abdikamalov *et al.* 2014, Ott, Abdikamalov *et al.* 2013).

- Discovery of the correlation between the gravitational and neutrino signal from rapidly rotating core collapse supernovae (Ott, Abdikamalov *et al.* 2012).
- Demonstration of the existence of runaway instability in accretion disks around black holes (Korobkin, Abdikamalov *et al.* 2013).

Scientific Interests and Expertise

- Computational methods for multi-dimensional radiation transport. Deterministic and Monte Carlo approaches.
- Scientific high-performance computing. Application and development of simulation software to petascale parallel supercomputers and beyond. Heterogeneous computing.
- Core-collapse supernova theory. Numerical modeling of stellar core-collapse, postbounce evolution, explosion, nucleosynthesis. Connection to long gamma-ray bursts. Gravitational wave signature. Protoneutron star evolution. Nuclear and neutrino physics and astrophysics. Accretion-induced collapse of white dwarfs.
- Gravitational wave astronomy. Numerical modeling of astrophysical sources of gravitational radiation.
- Oscillations of neutron stars and their observational signatures. The neutron star magnetospheres.

Research Funding Awards

- NU ORAU Grant, PI, 2015-2018
- NU Social Policy Grant, PI, 2015-2016
- NVIDIA Corporation Hardware Grant, PI, 2015-2016

Computer Time Awards

- NSF XSEDE computer time grant, XRAC, Co-I, 41 million service units, 2013-2014
- NSF XSEDE computer time grant, XRAC, Co-I, 9.5 million service units, 2012-2013
- NSF Teragrid computer time grant, TRAC, Co-I, 10.5 million service units, 2011-2012
- NSF Teragrid computer time grant, TRAC, Co-I, 7.6 million service units, 2010-2011
- LONI computer time grant, Co-I, 4.0 million service units, 2011-2012
- NERSC computer time grant, Co-I, 6 million service unit , 2012-2013

Teaching experience

- Physics I for Scientists and Engineers (Nazarbayev University, Fall 2014, 2016).
- Astronomy I (Nazarbayev University, Fall 2015).
- Computational Physics (Nazarbayev University, Spring 2015 and 2016).
- Physics II for Scientists and Engineers Recitations (Nazarbayev University, Spring 2015).
- Computational Astrophysics course at Caltech. Lectures radiation transport and numerical hydrodynamics.

Other activities

- Creator and maintainer of the pages of the Department of Physics of Nazarbayev University on social media platforms facebook and twitter. 2015-present.

- Organizer of General Relativity Day at Nazarbayev University, 25/4/2015
- Organizer of Theoretical Astrophysics (TAPIR) seminars at Caltech. 9/2012-12/2013.
- Moderator of Friday morning astro-ph discussions at Caltech. 5/2013-3/2014.

Journal Referee

- Astrophysical Journal
- MNRAS, MNRAS Letters
- International Journal of Heat and Mass Transfer
- Journal of Physics G: Nuclear and Particle Physics

Languages

- English (fluent), Russian (fluent), Kazakh (basic), Karakalpak (native)

Refereed Publications (*h*-index: 14. Number of citations > 570.)

- **E. Abdikamalov**, A. Zhaksylyov, D. Radice, S. Berdibek, *Shock-turbulence interaction in core-collapse supernovae*, MNRAS, 461:3864, 2016.
- D. Alina, L. Montier, I. Ristorcelli, J.-P. Bernard, F. Levrier, **E. Abdikamalov**, *Polarization measurement analysis III. Analysis of the polarization angle dispersion function with high precision, polarization data*, Astronomy & Astrophysics, in press, 2016,
- D. Radice, C. D. Ott, **E. Abdikamalov**, S. M. Couch, R. Haas, E. Schnetter *Neutrino-Driven Convection in Core-Collapse Supernovae: High-Resolution Simulations*, ApJ 820:76, 2016
- J. Fuller, H. Klion, **E. Abdikamalov**, C. D. Ott, *Supernova Seismology: Gravitational Wave Signatures of Rapidly Rotating Core Collapse*, MNRAS, 450, 414, 2015
- **E. Abdikamalov**, C. D. Ott, D. Radice, L. Roberts, R. Haas, C. Reisswig, P. Mösta, H. Klion, and E. Schnetter, *Neutrino-driven Turbulent Convection and Standing Accretion Shock Instability in Three-Dimensional Core-Collapse Supernovae*, ApJ 808:70, 2015
- P. Mösta, S. Richers, C. D. Ott, R. Haas, T. Piro, K. Boydstun, **E. Abdikamalov**, C. Reisswig, and E. Schnetter, *Magnetorotational Core-Collapse Supernovae in Three Dimensions*, 2014, Astrophysical Journal Letter 785:L29, Arxiv e-prints:1403.1230.
- **E. Abdikamalov**, S. Gossan, A. DeMaio, C. D. Ott, *Measuring the Angular Momentum Distribution in Core-Collapse Supernova Progenitors with Gravitational Waves*, 2013, Physical Review D., Arxiv e-prints:1311.3678
- 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*, Physical Review Letters, 111:151101, 2013
- C. Reisswig, C. D. Ott, R. Haas, **E. Abdikamalov**, P. Mösta, D. Pollney, E. Schnetter, *Three-Dimensional General-Relativistic Hydrodynamic Simulations of Binary Neutron Star Coalescence and Stellar Collapse with Multipatch Grids*, Physical review D 87:064023, 2013

- C. D. Ott, **E. Abdikamalov**, P. Mösta, R. Haas, S. Drasco, E. O'Connor, C. Reisswig, C. Meakin, E. Schnetter, *General-Relativistic Simulations of Three-Dimensional Core-Collapse Supernovae*, *Astrophysical Journal* 768:115, 2013
- O. Korobkin, **E. Abdikamalov**, N. Stergioulas, E. Schnetter, B. Zink, S. Rosswog, C. D. Ott, *The runaway instability in general-relativistic accretion disks*, *MNRAS*, 431:349, 2013
- D. Radice, **E. Abdikamalov**, L. Rezzolla, C. D. Ott, *A New Spherical Harmonics Scheme for Multi-Dimensional Radiation Transport I. Static Matter Configurations*, *Journal of Computational Physics*, 242:648, 2013
- **E. Abdikamalov**, A. Burrows, C. D. Ott, F. Lffler, E. O'Connor, J. Dolence, E. Schnetter, *A New Monte Carlo Method for Time-dependent Neutrino Radiation Transport*, *The Astrophysical Journal*, 755:111, 2012
- C. D. Ott, **E. Abdikamalov**, E. O'Connor, C. Reisswig, R. Haas, P. Kalmus, S. Drasco, A. Burrows, E. Schnetter, *Correlated gravitational wave and neutrino signals from general-relativistic rapidly rotating iron core collapse*, *Physical Review D*, 86:024026, 2012
- C. D. Ott, C. Reisswig, E. Schnetter, E. O'Connor, U. Sperhake, F. Löffler, P. Diener, **E. Abdikamalov**, I. Hawke, A. Burrows, *Dynamics and Gravitational Wave Signature of Collapsar Formation*, *Physical Review Letters*, 106:161103, 2011
- O. Korobkin, **E. Abdikamalov**, E. Schnetter, N. Stergioulas, B. Zink, *Stability of general-relativistic accretion disks*, *Physical Review D*, 83:043007, 2011
- **E. Abdikamalov**, C. D. Ott, L. Rezzolla, L. Dessart, H. Dimmelmeier, A. Marek, and H.-T. Janka, *Axisymmetric General Relativistic Simulations of the Accretion-Induced Collapse of White Dwarfs*, *Physical Review D* 81, 044012, 2010.
- **E. Abdikamalov**, H. Dimmelmeier, L. Rezzolla and J. C. Miller, *Relativistic Simulations of the Phase-Transition-Induced Collapse of Neutron stars*, *MNRAS*, 392:52, 2009.
- **E. Abdikamalov**, B. J. Ahmedov and J. C. Miller, *The Magnetosphere of Oscillating Neutron Stars in General Relativity*, *MNRAS*, 395:443, 2009.

Semi-popular articles

- C. Reisswig, C. D. Ott, **E. Abdikamalov**, R. Haas, P. Mösta, E. Schnetter, *The Formation of Two Supermassive Black Holes from a Single Collapsing Supermassive Star*, *2Physics*, Dec 22, 2013

Invited Talks

- Physics Seminar, *The Explosions of Massive Stars*, June 13, 2016, University of Crete
- Seminar *Probing Core-Collapse Supernova Central Engine with Gravitational Waves*, 3rd International Workshop “Nuclear Physics and Astrophysics”, 14-16 April, 2016
- Physics Seminar, *Core-Collapse Supernovae*, Kazakh National University, Almaty, Kazakhstan, October 15, 2015

- Astrophysics Seminar, *Gravitational Waves from Core-Collapse Supernovae*, Albert Einstein Institute, Potsdam, Germany, August 5, 2015
- USA-Uzbekistan Conference in Physical Sciences and Engineering, *Core-Collapse Supernovae*, California State University Fullerton, May 21.
- CASA/JILA Astrophysics Lunch Seminar, JILA, University of Colorado Boulder *Core-Collapse Supernovae and Gravitational Waves* Boulder, February 7, 2014
- Physics Colloquium. California State University Los Angeles, *The Death of Massive Stars and Gravitational Waves*, Los Angeles, January 30, 2014,
- SIAM conference on computational science and engineering. *A New Monte Carlo method for radiation transport*, Boston, February 23, 2013
- LVC (LIGO-VIRGO Collaboration) extrig telecon talk. April 19, 2012. *Gravitational Waves from Core Collapse Supernovae*.
- Physics colloquium. Florida Atlantic University. April 8, 2011. *Computational Models of Long Gamma-Ray Burst Central Engines*.
- FAUST Seminar. Florida Atlantic University. April 7, 2011. *Accretion-Induced Collapse of White Dwarfs*.