

David A. Nichols

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Education

- **California Institute of Technology**, Pasadena, CA, September 2006 – Present.
M.S. in Physics, June 2008.
Doctoral candidate in Physics; expected date of graduation: June 2012.
Thesis Advisor: Dr. Yanbei Chen.
- **Claremont McKenna College**, Claremont, CA, September 2002 – May 2006.
B.A. in Mathematics and Physics.
Valedictorian, graduated *summa cum laude* and with honors in both majors.
Recipient of Best Physical Sciences and Best Mathematics Student Awards.
Senior Thesis: “The Mathematics and the Mechanics of Balance and Gait”
Thesis Advisor: Dr. John Milton
Received the Best Physical Sciences Thesis Award.

Awards, Honors, and Fellowships

- David and Barbara Groce Graduate Fellowship, 2009-2010.
- GGR Travel Grant, 2009, 2010.
- Rose Hills Foundation Graduate Fellowship, 2006-2007.
- Phi Beta Kappa, 2005.
- Barry M. Goldwater Scholarship, 2004 – 2006.

Publications

Peer-Reviewed Articles

- **D. A. Nichols**, R. Owen, F. Zhang, A. Zimmerman, J. Brink, Y. Chen, J. D. Kaplan, G. Lovelace, K. D. Matthews, M. A. Scheel, K. S. Thorne. “Visualizing Spacetime Curvature via Frame-Drag Vortexes and Tidal Tendexes: I. General Theory and Weak-Gravity Applications.” (accepted for publication in Phys. Rev. D) [arXiv:1108.5486.]
- A. Zimmerman, **D. A. Nichols**, F. Zhang. “Classifying the isolated zeros of asymptotic gravitational radiation by tendex and vortex lines.” Phys. Rev. D **84**, 044037 (2011). [arXiv:1107.2959.]

- R. Owen, J. Brink, Y. Chen, J. D. Kaplan, G. Lovelace, K. D. Matthews, **D. A. Nichols**, M. A. Scheel, F. Zhang, A. Zimmerman, K. S. Thorne. “Frame-Dragging Vortexes and Tidal Tendexes Attached to Colliding Black Holes: Visualizing the Curvature of Spacetime.” Phys. Rev. Lett. **106**, 151101 (2011). [arXiv:1012.4869.]
- **D. A. Nichols** and Y. Chen. “Hybrid method for understanding black-hole mergers: Head-on case.” Phys. Rev. D **82**, 104020 (2010). [arXiv:1007.2024.]
- G. Lovelace, Y. Chen, M. Cohen, J. D. Kaplan, D. Keppel, K. D. Matthews, **D. A. Nichols**, M. A. Scheel, and U. Sperhake. “Momentum Flow in Black-Hole Binaries: II. Numerical Simulations of Equal-Mass, Head-on Mergers with Antiparallel Spins.” Phys. Rev. D **82**, 064031 (2010). [arXiv:0907.0869.]
- D. G. Keppel, **D. A. Nichols**, Y. Chen and K. S. Thorne. “Momentum Flow in Black-Hole Binaries: I. Post-Newtonian Regime and Bobbing in the Extreme-Kick Configuration.” Phys. Rev. D. **80**, 124015 (2009). [arXiv:0902.4077.]
- J. D. Kaplan, **D. A. Nichols** and K. S. Thorne. “Post-Newtonian Approximation in Maxwell-Like Form.” Phys. Rev. D **80**, 124014 (2009). [arXiv:0808.2510.]

Pre-Prints and In Preparation

- **D. A. Nichols** and Y. Chen. “Hybrid method for understanding black-hole mergers: Inspiralling case.” [arXiv:1109.0081.]
- “Visualizing Spacetime Curvature via Frame-Drag Vortexes and Tidal Tendexes: II. Stationary and Perturbed Black Holes.”(in preparation).

Talks

Invited Talks

- **Claremont Center for Mathematical Sciences Colloquium**, Claremont, CA, February 16, 2011. “Black-Hole Binaries: Observing, Visualizing, and Understanding Strongly Curved, Dynamical Spacetime.”

Contributed Talks

- **APS April Meeting**, Anaheim, CA, April 30, 2011. “Vortex and Tendex Lines in Post-Newtonian and Black-Hole Perturbation Spacetimes.”
- **PCGM27**, Pasadena, CA, March 18, 2011. “Vortex and Tendex Lines in Post-Newtonian and Black-Hole Perturbation Spacetimes.”
- **PCGM26**, San Diego, CA, March 26, 2010. “A Hybrid Approximation Technique for Head-on Black-Hole-Binary Mergers.”
- **APS April Meeting**, Washington DC, February 14, 2010. “A Hybrid Approximation Technique for Head-on Binary-Black-Hole Mergers.”
- **APS April Meeting**, Denver, CO, May 3, 2009. “Momentum Flow in Inspirling Binary Black Holes.”
- **PCGM25**, Eugene, OR, March 28, 2009. “Momentum Flow in Black-Hole Binaries: Post-Newtonian Approximation.”

Teaching Experience

- **Visiting Instructor of Physics (part-time)**, Claremont McKenna College, January – May 2011.
Served as the sole instructor for Physics 114, a junior-senior-level quantum mechanics course. Developed course materials, delivered lectures, wrote problem sets and exams and their solutions.
- **Head Teaching Assistant**, California Institute of Technology, September – December 2010.
Organized grading, homework and quiz solutions, review sessions and course webpage as head teaching assistant; taught a recitation section of Physics 2a, sophomore-level wave mechanics and quantum mechanics, as well.
- **Section Teaching Assistant**, California Institute of Technology, September 2008 – March 2009.
Led a section of Physics 2a and 2b, sophomore-level wave mechanics, quantum mechanics, and statistical mechanics.
- **Section Teaching Assistant**, California Institute of Technology, September 2007 – June 2008.
Taught a section of Physics 1a, 1b, and 1c, introductory mechanics and electromagnetism (analytical track), including special relativity and vector calculus.

References

Available Upon Request