Tyler J. Volkoff (볼컵 타일어)

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Current as of 08/17/2015

Education:

Kerman High School Kerman, CA	*Diploma* (2006)
California Institute of Technology Pasadena, CA	*B.S. with honor, Biology* (2009)
University of California, Berkeley Berkeley, CA	*Ph.D., Chemistry* (2014)
As a visitor: Konkuk University (건국대학교) Seoul, Rep. of Korea	(2011-2012)

Employment:

- 2009-2014. Graduate Student Researcher, Dept. of Chemistry, UC Berkeley. Advisor: K. Birgitta Whaley
- 2015-. Postdoctoral Researcher, Center for Theoretical Physics, Seoul National University, Seoul, Rep. of Korea. Associated faculty: Uwe R. Fischer

Research interests:

- Exotic and/or encoded quantum superposition states of quantum fields for ultraprecise parameter estimation and quantum technologies
- Matter-wave interference in weakly- and strongly-interacting bosonic systems
- Vortex dynamics in BECs, liquid ^{4}He and superconductors
- Optimal quantum state discrimination in separable Hilbert space
- Low-dimensional condensed matter physics in the context of quantum computation and quantum error correction

Publications:

1. T.J.V., Whaley, K.B. “Quantum dynamics of local phase differences between reservoirs of driven interacting bosons separated by simple aperture arrays" *J. Phys.: Condens. Matt.*, **25**, 466883, (2013).
2. T.J.V., Whaley, K.B. “Measurement- and comparison-based sizes of Schrödinger cat states of light" *Phys. Rev. A*, **89**, 012122, (2014).
3. T.J.V., Kwon, Y., Whaley, K.B. “Numerical simulation of ^{4}He superfluid weak link formation in nanoaperture arrays” *arXiv*, 1404.0779, (2014).
4. T.J.V., Whaley, K.B. “Macroscopicity of quantum superpositions on a one-parameter unitary path in Hilbert space " *Phys. Rev. A*, **90**, 062122 (2014).

5. T.J.V. "Macroscopic quantum phenomena in interacting bosonic systems: Josephson flow in liquid ^{4}He and multimode Schrödinger cat states" Ph.D. dissertation, Univ. of Calif. Berkeley, (2014).
6. T.J.V. "Remnant quantum resources of collapsed macroscopic quantum superpositions " *arXiv*, 1502.04227, (2015).
7. T.J.V. "Nonclassical properties and quantum resources of hierarchical photonic superposition states" submitted to *J. Exp. Theor. Phys.* (2015).
8. T.J.V., Whaley, K.B. "Distinguishability dynamics and quantum speed limits in the Bloch ball" *arXiv* (2015).

Honors and grants:

- 2014. Howard W. Crandall Fellowship (Berkeley full tuition and stipend for "distinguished academic record")
- 2014. Graduate Division Conference Travel Grant, UC Berkeley
- 2012. NSF East Asia and Pacific Summer Institute Fellowship, NSF Award No. 1208699
- 2008. Dr. and Mrs. Daniel C. Harris SURF Fellow, Caltech. Project: "An efficient stereoselective synthesis of aplysin through a Claisen rearrangement" Advisors: Andrew McClory and Brian Stoltz
- 2007. NSF REU Fellow, Caltech. Project: "Cis-regulatory and expression analysis of the delta gene in the sea urchin *S. purpuratus*" Advisors: Joel Smith, Eric Davidson

Presentations:

- 2015. Institute for Quantum Computing seminar, Talk: "Macroscopicity and metrological usefulness of a large class of quantum superpositions," Host: C. Herdman, Univ. of Waterloo
- 2015. Center for Quantum Information and Control seminar, Host: C. Caves, Univ. of New Mexico
- 2014. Berkeley Quantum Information and Computation Center seminar, Host: UC Berkeley Dept. of Chemistry
- 2014. APS March Meeting 2014 Session S34 Atomic, Molecular, and Optical Quantum Information Processing: Photons and Atoms. Talk: "Measurement- and comparison-based sizes of Schrödinger cat states of light"
- 2012. Poster, "Quantum Molecular Dynamics: a conference in honor of William H. Miller," UC Berkeley
- 2012. EAPSI Korea Research Seminar, Seoul, Rep. of Korea
- 2011. Geometry, Representations, and Some Physics seminar. Talk: "A brief introduction to renormalization," Host: UC Berkeley Dept. of Mathematics
- 2011. Quantum Phases and Devices seminar, Host: Prof. Yongkyung Kwon, Konkuk University (Seoul, Rep. of Korea)
- 2010. Graduate Research Colloquium, Host: UC Berkeley College of Chemistry

Professional activities:

- 2013-2015. Organizer of Berkeley Quantum Information and Computation Center (BQIC) seminar series

- 2013. Kavli Institute of Theoretical Physics program on "Control of complex quantum systems," UC Santa Barbara

Teaching Experience:

- Fall 2014. Graduate Student Instructor, Chemistry 130b (Biophysical Chemistry), UC Berkeley
- Fall 2011. Graduate Student Instructor, Chemistry 221a (Advanced Quantum Mechanics I), UC Berkeley
- Spring 2010. Graduate Student Instructor, Chemistry 120a (Physical Chemistry), UC Berkeley
- Fall 2009. Graduate Student Instructor, Chemistry 1a (General Chemistry), UC Berkeley

Relevant coursework:

Undergraduate:

(Caltech)

molecular/cell biology	biophysics
genetics	statistics
neuroscience	differential equations
developmental biology	Newtonian mechanics
biochemistry	electrodynamics/special relativity
gene regulatory networks	quantum mechanics

Graduate:

(Berkeley)	*(Caltech)*
classical electromagnetism (O. Ganor)	chemical synthesis
complex analysis (A. Grünbaum)	molecular neuroscience
quantum field theory (A. Vishwanath)	bioinorganic chemistry
Banach algebras and spectral theory (S. Evans)	hematopoiesis
classical/quantum integrable systems (N. Reshetikhin)	systems biology
chemistry teaching techniques	chemical dynamics (A. Kuppermann)
	statistical physics (G. Refael)