Ryotatsu Yanagimoto | Curriculum Vitae

Edward L. Ginzton Laboratory, Stanford University, Stanford, CA 94303, USA
Phone: (650) 289-8955 • Email: ryotatsu@stanford.edu

Education

Stanford University **Stanford, CA, USA**
Ph.D. in Applied Physics (Research advisor: Prof. Hideo Mabuchi) *Sep. 2017 – present*

- Working on the theoretical research of the broadband non-Gaussian quantum optics and their utilities for quantum engineering and computation

The University of Tokyo **Bunkyo-ku, Tokyo, Japan**
B.A. in Engineering (Research Advisor: Prof. Hidetoshi Katori) *Apr. 2013 – Mar. 2017*

- First two years (April 2013 – March 2015) at the Junior Division at College of Arts and Sciences (GPA: 3.34/4.00)
- Last two years (April 2015 – March 2017) at the Department of Applied Physics, Faculty of Engineering (GPA: 3.95/4.00)
- Dissertation title: "Characterization of collisional shifts in optical lattice clocks based on asymmetries in the Ramsey spectrum."

Research Activities

Stanford University **Stanford, CA, USA**
Graduate research assistant at Mabuchi lab *Sep. 2017 – Dec. 2017, Apr. 2018 – present*

- Working under the supervision of Prof. Hideo Mabuchi on theoretical work of quantum optics and quantum information (refer to publications section for more details)
- Current research interests are on quantum mechanical aspects of broadband nonlinear optical phenomena and their applications to quantum engineering
- Having been involved in experiments on ultra-fast pulsed optical parametric oscillators

Graduate research assistant at Schleier-Smith lab *Jan. 2018 – Mar. 2018*

- Worked under the supervision of Prof. Schleier-Smith on experimental research of cavity quantum electrodynamics
- Involved in spin-exchange experiments with rubidium atoms

RIKEN **Wako-shi, Saitama, Japan**
Research assistant at Quantum Metrology Lab *Apr. 2017 – Aug. 2017*

- Experimental work on characterizing lattice light shifts of an Yb^{171} optical lattice clock
- Development of mode cleaner cavities for noise reduction of lattice light
- Involved in the precision measurements of the frequency ratio between Yb^{171} and Sr^{87}

Undergraduate research assistant at Quantum Metrology Lab *Apr. 2016 – Mar. 2017*

- Performed research under the supervision of Prof. Hidetoshi Katori on an Yb^{171} optical lattice clock (part of the research was done at the University of Tokyo as well)
- Developed a stable U.V. light source to facilitate long-term clock operations
- Awarded Distinguished Thesis Award and Dean Award (Faculty of Engineering) for research on the Ramsey spectra in the presence of atomic interactions

Durham University **Durham, UK**

Research Intern at Superconductivity Group *Jan. 2016 – Mar. 2016*

- Worked under the supervision of Prof. Damian Hampshire for characterizations of superconducting materials for International Thermonuclear Experimental Reactor (ITER)

Publications and preprints

1. **R. Yanagimoto***, R. Nehra*, R. Hamerly, E. Ng, A. Marandi, H. Mabuchi, “Quantum nondemolition measurements with optical parametric amplifiers for ultrafast universal quantum information processing”, arXiv:2209:01114.
2. **R. Yanagimoto**, E. Ng, M. Jankowski, H. Mabuchi, R. Hamerly, “Temporal trapping of ultrashort pulses enables deterministic optical quantum computation”, arXiv:2203.11909.
3. **R. Yanagimoto***, E. Ng*, A. Yamamura, T. Onodera, L. G. Wright, M. Jankowski, M. M. Fejer, P. L. McMahon, H. Mabuchi, “Onset of non-Gaussian quantum physics in pulsed squeezing with mesoscopic fields”, Optica **9**, 379 (2022).
4. **R. Yanagimoto**, E. Ng, L. G. Wright, T. Onodera, H. Mabuchi, “Efficient simulation of ultrafast quantum nonlinear optics with matrix product states,” Optica **8**, 1306 (2021).
5. **R. Yanagimoto***, E. Ng*, T. Onodera, H. Mabuchi, “Towards an engineering framework for ultrafast quantum nonlinear optics,” Proc. SPIE 11684, Ultrafast Phenomena and Nanophotonics XXV, 116841D (2021).
6. **R. Yanagimoto***, E. Ng*, M. Jankowski, T. Onodera, M. M. Fejer, H. Mabuchi, “Broadband Parametric Downconversion as a Discrete-Continuum Fano Interaction,” arXiv:2009.01457.
7. **R. Yanagimoto*,** T. Onodera*, E. Ng, L. G. Wright, P. L. McMahon, H. Mabuchi, “Engineering a Kerr-based Deterministic Cubic Phase Gate via Gaussian Operations," Physical Review Letters **124**, 240503 (2020).
8. **R. Yanagimoto,** E. Ng, T. Onodera, H. Mabuchi, “Adiabatic Fock-state-generation scheme using Kerr nonlinearity," Physical Review A **100,** 033822 (2019).

9. **R. Yanagimoto,** P. L. McMahon, E. Ng, T. Onodera, H. Mabuchi, “Embedding entanglement generation within a measurement-feedback coherent Ising machine," arXiv:1906.04902 (2019).
10. N. Nemitz, A. A. Jørgensen, **R Yanagimoto**, F. Bregolin, H. Katori, "Modeling light shifts in optical lattice clocks," Physical Review A **99**, 033424 (2019). (Editors’ suggestion)
11. D. B. S. Soh, **R. Yanagimoto**, E. Chatterjee, H. Mabuchi, “Nonlinear optical response of a local surface plasmon coupled to a 2D material”, arXiv:1902.06943 (2019).
12. **R. Yanagimoto**, N. Nemitz, F. Bregolin, H. Katori, "Decomposed description of Ramsey spectra under atomic interactions," Physical Review A **98**, 012704 (2018).

Conference Presentations (all oral)

1. **R. Yanagimoto*,** E. Ng*, M. Jankowski, T. Onodera, M. M. Fejer, H. Mabuchi, “Broadband parametric downconversion: an analogy with Fano’s theory of atomic autoionization,” American Physical Society March Meeting 2021.
2. **R. Yanagimoto**, T. Onodera, E. Ng, L. G. Wright, P. L. McMahon, H. Mabuchi, "Measurement-free Kerr-based cubic phase gate with Gaussian operations," Conference on Lasers and Electro Optics 2020 (CLEO), QELS_Fundamental Science, FM2C.4.
3. **R. Yanagimoto**, P. L. McMahon, T. Onodera, E. Ng, H. Mabuchi, “Entangled-pulse generation inside coherent Ising machines using entanglement swapping," American Physical Society March Meeting 2019.
4. **R. Yanagimoto**, T. Onodera, E. Ng, H. Mabuchi, “Adiabatic Fock State Generation Scheme Using Kerr Nonlinearity," Conference on Lasers and Electro Optics 2018 (CLEO), QELS_Fundamental Science, FM3G.6.

Honors and Awards

Stanford Q-FARM Ph.D. Fellowship *2020 – 2022*

- Annual financial support of 50,000USD for 2 years

Fellowship from Masason Foundation *2017 – present*

- Masason foundation is a public interest incorporated association founded by Masayoshi Son supporting "youth who will create the future."
- Financial support (entire tuition) for pursuing degree and research at Stanford University

Distinguished thesis award *Mar. 2017*

- Awarded by the Department of Applied Physics, the University of Tokyo for the thesis research on Yb^{171} optical lattice clocks
- Awarded to distinguished thesis research of the year (a total of 5 out of ~50 students)

Dean Award (Faculty of Engineering, The University of Tokyo) *Mar. 2017*

- Dean award is given to one graduating student in each department of the Faculty of Engineering with the best academic and research outcome of the year.

Iwai Hisao Memorial Tokyo Scholarship *2015 – 2017*

- Awarded for outstanding academic records at the University of Tokyo, 1.2M JPY per year

Professional Memberships

American Physical Society (APS)

The Optical Society (OSA)