Ryotatsu Yanagimoto | Curriculum Vitae

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# 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 Yb171 optical lattice clock
* Development of mode cleaner cavities for noise reduction of lattice light
* Involved in the precision measurements of the frequency ratio between Yb171 and Sr87

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

* Performed research under the supervision of Prof. Hidetoshi Katori on an Yb171 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**, E. Ng, M. Jankowski, H. Mabuchi, R. Hamerly, “Temporal trapping of ultrashort pulses enables deterministic optical quantum computation”, arXiv:2203.11909.
2. **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”, arXiv:2111.13799. (To be published on Optica)
3. **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).
4. **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).
5. **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.
6. **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).
7. **R. Yanagimoto,** E. Ng, T. Onodera, H. Mabuchi, “Adiabatic Fock-state-generation scheme using Kerr nonlinearity," Physical Review A **100,** 033822 (2019).
8. **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).
9. 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)
10. 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).
11. **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 Yb171 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)