

Ryotatsu Yanagimoto | Curriculum Vitae

Physics & Informatics Laboratories, NTT Research, Inc., Sunnyvale, CA 94085, USA
Phone: (650) 289-8955 • Email: ryotatsu.yanagimoto@ntt-research.com

Education

Stanford University

Stanford, CA, USA

Ph.D. in Applied Physics (Research advisor: Prof. Hideo Mabuchi)

Sep. 2017 – Apr. 2023

- Dissertation title: "Quantum dynamics of broadband nonlinear photonics : from phenomenology to function"

The University of Tokyo

Bunkyo-ku, Tokyo, Japan

B.E. in Applied Physics (Research advisor: Prof. Hidetoshi Katori)

Apr. 2013 – Mar. 2017

- Dissertation title: "Characterization of collisional shifts in optical lattice clocks based on asymmetries in the Ramsey spectrum"

Research Activities

Cornell University

Ithaca, NY, USA

NTT postdoctoral fellow (PI: Prof. Peter L. McMahon)

Apr. 2023 – Present

Stanford University

Stanford, CA, USA

Graduate research (PI: Prof. Hideo Mabuchi)

Sep. 2017 – Apr. 2023

- Working on ultrafast quantum nonlinear optics and their applications for quantum engineering and information processing (refer to publications section for more details)
- Having been involved in experiments on ultra-fast pulsed optical parametric oscillators

RIKEN

Wako-shi, Saitama, Japan

Research assistant (PI: Prof. Hidetoshi Katori)

Apr. 2016 – Aug. 2017

- Both theoretical and experimental work on the characterization of collisional frequency shifts in Yb^{171} optical lattice clocks (part of the research performed at the University of Tokyo)
- Experimental work on the characterization of lattice light shifts in Yb^{171} optical lattice clocks
- Involved in the precision measurements of the frequency ratio between Yb^{171} and Sr^{87}
- Awarded Distinguished Thesis Award and Dean Award (Faculty of Engineering)

- Characterizations of superconducting materials for International Thermonuclear Experimental Reactor (ITER)

Publications and Preprints

1. **R. Yanagimoto***, E. Ng*, M. Jankowski, R. Nehra, T. P. McKenna, T. Onodera, L. G. Wright, R. Hamerly, A. Marandi, M. M. Fejer, H. Mabuchi, “Mesoscopic ultrafast nonlinear optics—The emergence of multimode quantum non-Gaussian physics”, arXiv:2311.13775.
2. C. Gustin*, **R. Yanagimoto***, E. Ng, T. Onodera, H. Mabuchi, “Using system-reservoir methods to derive effective field theories for broadband nonlinear quantum optics: a case study on cascaded quadratic nonlinearities”, arXiv:2311.03597.
3. E. Ng*, **R. Yanagimoto***, M. Jankowski, M. M. Fejer, H. Mabuchi, “Quantum noise dynamics in nonlinear pulse propagation”, arXiv:2307.05464.
4. **R. Yanagimoto***, R. Nehra*, E. Ng, A. Marandi, H. Mabuchi, “Engineering cubic quantum nondemolition Hamiltonian with mesoscopic optical parametric interactions”, arXiv:2305.03260.
5. **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”, PRX Quantum **4**, 010333 (2023).
6. **R. Yanagimoto**, E. Ng, M. Jankowski, H. Mabuchi, R. Hamerly, “Temporal trapping: a route to strong coupling and deterministic optical quantum computation”, Optica **9**, 1289 (2022).
7. **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).
8. **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).
9. **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).
10. **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.
11. **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).

12. **R. Yanagimoto**, E. Ng, T. Onodera, H. Mabuchi, "Adiabatic Fock-state-generation scheme using Kerr nonlinearity," *Physical Review A* **100**, 033822 (2019).
13. **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).
14. 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)
15. 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).
16. **R. Yanagimoto**, N. Nemitz, F. Bregolin, H. Katori, "Decomposed description of Ramsey spectra under atomic interactions," *Physical Review A* **98**, 012704 (2018).

Honors and Awards

- | | |
|--|--------------------|
| <i>Stanford Q-FARM Ph.D. Fellowship</i> | <i>2020 – 2022</i> |
| <ul style="list-style-type: none"> - Annual financial support of 50,000 USD for 2 years | |
| <i>Fellowship from Masason Foundation</i> | <i>2017 – 2022</i> |
| <ul style="list-style-type: none"> - 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 | |
| <i>Distinguished thesis award</i> | <i>Mar. 2017</i> |
| <ul style="list-style-type: none"> - Awarded by the Department of Applied Physics, the University of Tokyo for the undergraduate thesis research - The award is given to distinguished thesis research of the year | |
| <i>Dean Award (Faculty of Engineering, The University of Tokyo)</i> | <i>Mar. 2017</i> |
| <ul style="list-style-type: none"> - The award is given to one graduating student with the best academic and research records in each department | |
| <i>Iwai Hisao Memorial Tokyo Scholarship</i> | <i>2015 – 2017</i> |
| <ul style="list-style-type: none"> - Annual financial support of 1.2M JPY awarded for the outstanding academic records at the University of Tokyo | |

Professional Memberships

American Physical Society (APS)

Optica (formerly OSA)