Kenta Kasai

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Research interests	Quantum error correction, coding theory, information theory, LDPC codes, iterative decoding

Appointments

- 2024–present: Associate Professor, Institute of Science Tokyo
- 2012–2024: Associate Professor, Tokyo Institute of Technology
- 2006–2012: Assistant Professor, Tokyo Institute of Technology
- 2008–2009: Visiting Researcher, École Nationale Supérieure de l'Electronique et de ses Applications (ENSEA), France

Education

- Ph.D. in Engineering, Tokyo Institute of Technology, 2006
- M.E. in Engineering, Tokyo Institute of Technology, 2003
- B.E. in Engineering, Tokyo Institute of Technology, 2001

Selected Recent Publications

1. Daiki Komoto and Kenta Kasai, "Quantum Error Correction near the Coding Theoretical Bound," *npj Quantum Information*, vol. 11, article 154, 2025. DOI: 10.1038/s41534-025-01090-1.
2. Kenta Kasai, "Breaking the Orthogonality Barrier in Quantum LDPC Codes," *arXiv:2601.08824*, 2026.
3. Koki Okada and Kenta Kasai, "Random Construction of Quantum LDPC Codes," *arXiv:2511.04634*, 2025.
4. Tomoya Hirobe and Kenta Kasai, "Recursively Extended Permutation Codes under Chebyshev Distance," *IEEE Transactions on Information Theory*, vol. 71, no. 11, pp. 8312–8323, 2025.
5. Kenta Kasai, "Systematic Non-Binary Extension of LDPC-CSS Codes Preserving Orthogonality," *arXiv:2510.25583*, 2025.
6. Daiki Komoto and Kenta Kasai, "Sharp Error-Rate Transitions in Quantum QC-LDPC Codes under Joint BP Decoding," *arXiv:2507.11534*, 2025.
7. Kenta Kasai, "Quantum Error Correction Exploiting Degeneracy to Approach the Hashing Bound," *arXiv:2506.15636*, 2025.
8. Kenta Kasai, "Efficient Mitigation of Error Floors in Quantum Error Correction Using Non-Binary Low-Density Parity-Check Codes," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, 2025.
9. Kenta Kasai, "Quantum Error Correction with Girth-16 Non-Binary LDPC Codes via Affine Permutation Construction," in *Proc. International Symposium on Topics in Coding (ISTC)*, 2025.
10. Daiki Komoto and Kenta Kasai, "Explicit Construction of Classical and Quantum Quasi-Cyclic Low-Density Parity-Check Codes with Column Weight 2 and Girth 12," *arXiv:2501.13444*, 2025.

Representative Earlier Publications

1. Kenta Kasai, Mitsuru Hagiwara, Hideki Imai, and Kohichi Sakaniwa, "Quantum Error Correction beyond the Bounded Distance Decoding Limit," *IEEE Transactions on Information Theory*, vol. 58,

no. 2, pp. 1223–1230, 2012.

2. Kenta Kasai and Kohichi Sakaniwa, "Spatially-Coupled MacKay-Neal Codes and Hsu-Anastasopoulos Codes," *IEICE Transactions on Fundamentals*, vol. E94-A, no. 11, pp. 2161–2168, 2011.
3. Kenta Kasai, David Declercq, Charly Poulliat, and Kohichi Sakaniwa, "Multiplicatively Repeated Non-Binary LDPC Codes," *IEEE Transactions on Information Theory*, vol. 57, no. 10, pp. 6788–6795, 2011.
4. Kenta Kasai, Charly Poulliat, David Declercq, and Kohichi Sakaniwa, "Weight Distribution of Non-binary LDPC Codes," *IEICE Transactions on Fundamentals*, vol. E94-A, no. 4, pp. 1106–1115, 2011.
5. Thibault Deleu, Mathieu Dervin, Kenta Kasai, and François Horlin, "Iterative Predistortion of the Nonlinear Satellite Channel," *IEEE Transactions on Communications*, vol. 62, no. 8, pp. 2916–2926, 2014.

Selected Talks and Activities

- Invited Speaker, Information Theory and Applications (ITA) 2026, San Diego, USA
- Invited Speaker, IEEE Information Theory Workshop (ITW) 2011, Paraty, Brazil
- Program Committee Member, Quantum Error Correction (QEC26), 2026
- Presenter, IEEE ISIT 2025
- Presenter, ISTC 2025

Honors

- Young Researcher's Award, IEICE, 2005
- Seiichi Tejima Doctoral Dissertation Award, Tokyo Institute of Technology, 2007
- Yujiro Niwa Outstanding Paper Award, Tokyo Denki University, 2007
- Ericsson Young Scientist Award, 2010
- Young Researcher's Award, Society of Information Theory and its Applications, 2010

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