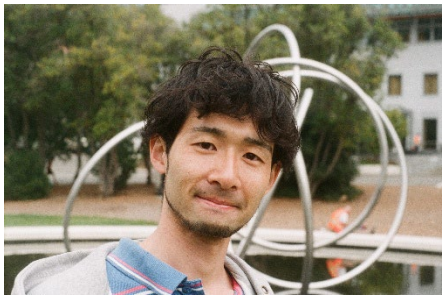
DEPARTMENT OF MATHEMATICAL SCIENCES

QIT Thinking Seminar



Takuya Machida

Nihon University

Long-time limiting theorems for some quantum walks

Abstract: Quantum walks are quantum analogs of random walks in mathematics. While random walks converge in normal distributions, quantum walks converge in probability distributions different from normal distributions. The speaker has been working on limiting theorems for quantum walks since 2004.

Picking some of his papers [1-6], he will shortly talk about the limiting theorems for one dimensional quantum walks. The theorems primarily focus on long-time limiting distributions, from which we will see interesting behavior of quantum walks (e.g. localization, gap, phase transition).

[1] Takuya Machida, Norio Konno : Limit theorem for a time-dependent coined quantum walk on the line, F. Peper et al. (Eds.): IWNC 2009, Proceedings in Information and Communications Technology, Vol.2, pp.226-235 (2010).

[2] F. Alberto Grunbaum, Takuya Machida : A limit theorem for a 3-period time-dependent quantum walk, Quantum Information and Computation, Vol.15 No.1&2, pp.50-60 (2015).

[3] Takuya Machida : A limit theorem for a splitting distribution of a quantum walk, International Journal of Quantum Information, Vol.16, No.3, 1850023 (2018).

[4] Takuya Machida : Limit theorems of a 3-state quantum walk and its application for discrete uniform measures, Quantum Information and Computation, Vol.15 No.5&6, pp.406-418 (2015).

[5] Takuya Machida : Limit distribution of a continuous-time quantum walk with a spatially 2-periodic Hamiltonian, Quantum Information Processing, Vol.22, 332 (2023).

[6] Takuya Machida : Phase transition of a continuous-time quantum walk on the half line, Quantum Information Processing, Vol.23, 243 (2024).

Friday, August 14, 2026

10:00 AM – 11:00 AM

Stratton Hall 301

WPI