凝縮系物理学ゼミナール

Condensed Matter Seminar

Location: **zoom**, Date: **13:30-15:00**, Wednesday, 18 November 2020

“Topological Phenomena in quantum walks unique to Floquet and/or open systems”

Speaker:

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Abstract:

In this seminar, I mainly talk about bifurcations of topological edge states in nonlinear quantum walks [1]. Quantum walk is one of photonic Floquet systems in which time evolves in a discrete manner. Since quantum walks have high tunability of topological numbers, edge states which originate from Floquet topological phases can be directly observed in real space [2]. Also, nonlinear effects in quantum walks have been introduced [3] and the stability of edge states has been discussed [4]. While the stability of edge states has been explored in the continuum time limit [4], which results in ignoring uniqueness of Floquet systems, we rigorously take the discrete nature of time into account. As a result, we find bifurcations where edge states change from stable attractors to unstable repellers, which originate from the discreteness of time [1]. Furthermore, we analytically derive bifurcation thresholds, which is generally difficult in a wide range of nonlinear systems.

If there is plenty of time, I also talk about topological edge states in post-selected open quantum walks [5-7] and time-glide symmetric quantum walks [8]. In all phenomena mentioned above, peculiarity of Floquet and/or open systems plays important roles, which indicates that quantum walks are versatile platforms to explore Floquet and open systems.

References:

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