凝縮系物理学ゼミナール
Condensed Matter Seminar

Location: Room 413, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: 13:30-14:15, Wednesday, 24 October 2012

"Topological phases and Anderson localization of one dimensional quantum walks with disorder"

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Abstract:

Quantum walk is the time evolution of quantum states and becomes random walk in classical limit. Because of application of quantum walk to quantum computation, quantum walk has been investigated vigorously recently. In the previous study [1], Anderson localization and edge states of a topological phase were investigated in the system characterized by a certain coin operator with disorder.

We have investigated Anderson localization and edge states of a topological phase in the system characterized by another coin operator. We have found that edge states exist in the system without disorder. In addition, the density of states diverges for $\omega=0, \pi$ and the variance increases by power in the system with disorder. This shows that Anderson delocalized states and Anderson localized states coexist in the system with disorder because Anderson transition occurs at $\omega=0, \pi$.

Reference:

[1] H.Obuse and N. Kawakami: Phys.Rev.B. **84**, 195139 (2011).