

1127-19-111

Kiyonori Gomi* (kgomi@math.shinshu-u.ac.jp), 3-1-1 Asahi, Matsumoto, Nagano 390-8621, Japan. *K-theory, gapped quantum system and C-symmetric indefinite metric space.*

Since Kitaev's work about the periodic table, topological K -theory has been recognized as a useful tool for classifications of gapped quantum systems such as topological insulators. Usually, such a quantum system is described by a self-adjoint operator acting on a Hilbert space, and the inner product of a Hilbert space is positive definite. However, some meta-materials are described by operators on a Hilbert space which are self-adjoint with respect to an indefinite inner product. An example is a photonic crystal, though is a classical system.

The spectra of a self-adjoint operator on a Hilbert space with indefinite metric are generally not real, whereas the reality of the spectral seems to be essential to descriptions of physical systems. A way to ensure the positivity of the spectra is to impose a so-called C -symmetry.

The introduction of C -symmetry allows us to formulate a K -theory which serves as a tool for classifications of gapped systems described by self-adjoint operators on Hilbert spaces with possibly indefinite inner product. Further, this K -theory can be interpreted as a K -theory introduced by Freed and Moore. I will talk about these results obtained in a joint work with Giuseppe de Nittis. (Received January 28, 2017)