

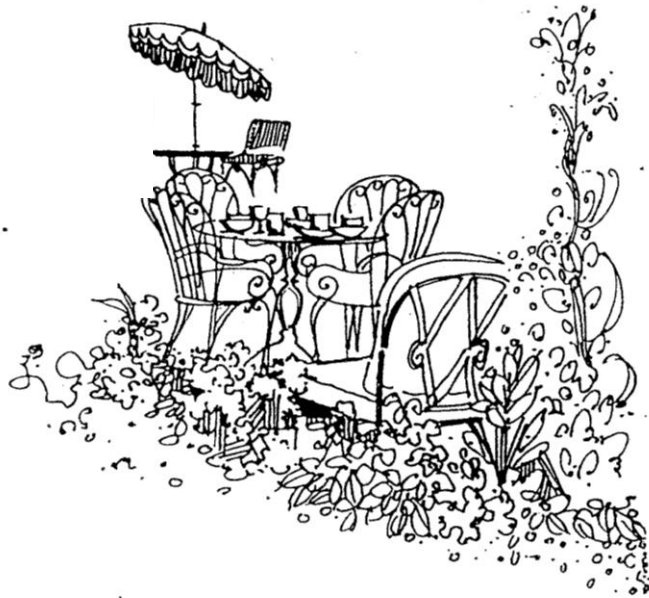
Chez Pierre

Presents ...

Thursday, March 10, 2011

11:00am

MIT Room 4-331



SPECIAL CHEZ PIERRE SEMINAR

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“Ten-fold classification of topological insulators and superconductors”

Recently, a new type of insulators (" Z_2 topological insulator" or "topological insulator") has been discovered. They can be thought of as a close cousin of the integer quantum Hall effect (IQHE), but different from the IQHE in many essential ways: topological insulators can exist only when time-reversal symmetry is respected, and can be either two- or three-dimensional. Furthermore, topological insulators are characterized by a binary topological number, unlike the integral Hall conductivity in the IQHE. Recent experiments discovered HgTe quantum well and Bismuth-related materials indeed realize such non-trivial topological phases in two and three dimensions, respectively.

In this talk, we propose to integrate all known topological insulators, including the IQHE, Z_2 topological insulators, and some topological superconductors, into a single "periodic table". It is an exhaustive classification scheme of electronic systems as well as superconductors in terms of their discrete symmetries (such as time-reversal), and has an interesting periodic structure both in terms of types of discrete symmetries and spatial dimensions. Moreover, the proposed classification predicts a number of new topological insulators and superconductors which await to be discovered experimentally.