A Survey of Topological Condensed Matter

Based on the speaker's recent article in Donga science ( <http://dl.dongascience.com/magazine/view/S201704N055>), I give a pedestrian introduction to the quantum materials revolution that's been quietly sweeping across the condensed matter physics community for the past decade. The inception was laid down by Thouless and co-workers in their explanation of integer quantum Hall effect put forward in 1982. The idea has eventually evolved into the spontaneous quantum Hall effect of Haldane and bore fruit in the quantum spin Hall realization. The three-dimensional generalization was a true breakthrough that led to the identification of topological insulator - a bulk insulator with topologically protected surface metallic states - and the topological classification of matter. Weyl semimetal is an outgrowth of the topological idea of the matter with metallic properties. In this talk, we review the progress made in various fields of topological material science using the language accessible to non-professional physicists.