



复旦大学物理系物质科学报告

Physics Department Colloquium

Topological Order and Defects, and Phase Transitions in Two Dimensions

Prof. John Michael Kosterlitz (*Nobel Laureate*)

Brown University



2016 Nobel Laureate in Physics (with David Thouless and Duncan Haldane)

Born in Aberdeen, Scotland, in 1943, Kosterlitz earned his Ph.D. from Oxford University in 1969. He is a fellow of the American Physical Society and received the Maxwell Medal from the U.K. Institute of Physics in 1980. In 2000 he was awarded the Lars Onsager Prize by the American Physical Society. In 2016, he was awarded the Nobel Prize in Physics with David Thouless and Duncan Haldane. He was inducted into the American Academy of Arts and Sciences as a fellow in 2007, and was elected a member of the US National Academy of Sciences in 2017.

Abstract: Man's understanding of matter, the distinct phases of it, started from water, or vapor, water, ice. The vapor-water transition, the phenomenon of condensation, was first understood by van der Waals (Nobel Prize in Physics 1910). But the melting transition of solid has eluded us, still in 3D. We made the breakthrough in understanding 2D melting and phase transitions that got us the Nobel Prize. In 1D, there is no solid to melt which was understood by Lev Landau (Nobel Prize in Physics 1962) long time ago. Landau's ideas of characterizing matter based on broken symmetries and long-range order gave us the tools to understand many things in nature, magnets, in particular. But Landau's idea was too strict, it turns out long-range order was not the most essential property of being a solid, it's the shear rigidity that makes solid a solid. In two-dimensions, Thouless and I proved that you can have a solid-liquid transition based on the unbinding of topological defects. It turns out this idea has broad applications to the understanding of many materials, superfluid helium films, magnets, liquid crystals, and quantum spin chains (Haldane, co-Nobel laureate).

Time: 2:00pm, Saturday, May 27, 2017

Location: Physics Building, Room 221B

(Cookies and coffee are served from 1:30 pm)