



# 清华大学高等研究院

Institute for Advanced Study, Tsinghua University

## *Colloquium*

**Title:** Topological Matter and Gauge Theory: Yang-Baxter joining Yang-Mills  
(拓扑物态和规范理论: 杨-巴克斯特联手杨-米尔斯)

**Speaker:** Professor Yong-Shi Wu  
*Fudan University and University of Utah*

**Time:** 4:00pm, Tuesday, June 30, 2015

**Venue:** Conference Hall 104, Science Building, Tsinghua University

### Abstract

This colloquium is an expanded version of my invited talk given at the Conference on 60 Years of Yang-Mills Gauge Field (Singapore; May 25-28, 2015).

The study of topological states of matter by now has become an important interdisciplinary frontier of Science, involving physics, mathematics and computer science. In this colloquium I will first present a retrospect of my personal experience in early 80's on the role that Gauge Invariance and Topological Effects of Gauge Field played in recognizing the Integer/Fractional Quantum Hall Effect as the first example of topological state of matter. And the retrospect on how Yang-Baxter equations became involved and played more and more important role in the pursuit of better understanding topological phases. Finally I shall talk about some recent progresses in exactly solvable discrete models that are related to the description of anyon matter, and interpret them as the attempts of gauging quantum groups (generalization of ordinary groups), in which both Yang-Baxter equations and Yang-Mills gauge principle play a fundamental conceptual role in setting up the framework.