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NCTS/NCHC Joint Mini-Workshop

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Mini-Workshop on the Trend of Future Computation, 2014
Oct. 30, National Center for High-Performance Computing

The workshop is to provide a platform stimulating discussions from a wide range of aspects for the future developing trends of Computation. The subjects and contents addressed in the invited lectures tend to be Pop-Sci and target at the general audience. The Workshop looks forward to welcoming attendants of various disciplines.

此迷你研討會的目的在於促成對未來計算發展的多面向討論, 而議題將以科普內容引入, 誠摯歡迎來自於不同領域聽眾的參與討論.

Agenda Oct. 30, NCHC

13:50 Opening

14:00 Prof. Hsi-Sheng Goan 管希聖, NTU
Quantum Computation and Quantum Information: an Overview
量子計算與量子資訊概述(簡介與綜述)

14:30 Prof. Yueh-Nan Chen 陳岳男, NCKU
From Quantum Information to Quantum Biology
從量子資訊到量子生物

15:00 Tea Break

15:30 Prof. Pochung Chen 陳柏中 NTHU
Topological Order and Quantum Entanglement
拓樸序與量子糾纏

16:00 P.I. Zhoujin Wu 吳宙錦 NCHC
Brief about the HPC Facility and the Plan for the Future
國網中心設施之現況說明及未來規劃

16:30 Adjourn

Quantum computation and quantum information: an overview

量子計算與量子資訊概述(簡介與綜述)

Hsi-Sheng Goan 管希聖

*Department of Physics and Center for Theoretical Sciences, National Taiwan University,
Center for Quantum Science and Engineering and National Center for Theoretical Physics,
National Taiwan University*

Quantum computation and quantum information exploit and explore quantum effects, based on the principles of quantum mechanics, to compute and process information in ways that are faster or more efficient than or even impossible on conventional computers or information processing devices. In this talk, I will introduce the basic physics and present the recent development in the field of quantum computation and quantum information.

From Quantum Information to Quantum Biology

從量子資訊到量子生物

Yueh-Nan Chen 陳岳男

Dept. of Physics, National Cheng Kung University

National Center for Theoretical Sciences (South)

Quantum coherence (or quantum entanglement) plays the central role in the field of quantum information science (QIS). In this talk, I will introduce how this non-trivial quantum effect is revealed by using the Bell's inequality or Leggett-Garg inequality. Moreover, recent evidence suggests that a variety of organisms may harness some of the unique features of quantum coherence to gain a biological advantage. I will also show that these inequalities, developed in QIS field, may be used to witness the quantum coherence in some biological systems.

Topological order and quantum entanglement

拓撲序與量子糾纏

Pochung Chen 陳柏中

Dept. of Physics, National Tsing Hua University

National Center for Theoretical Sciences

In this talk I will briefly introduce the basic idea of topological order, a novel order in zero-temperature. I will first explain why macroscopically the topological order is described by robust ground state degeneracy. I will then explain why microscopically topological order corresponds to pattern of long-range entanglement. Finally, I will describe how to use tensor network as a tool to characterize topological orders.

Brief about the HPC Facility and the Plan for the Future

國網中心設施之現況說明及未來規劃

Zhoujin Wu 吳宙錦

National Center for High-Performance Computing

For over a quarter century, NCHC has led the way in deploying and supporting cutting-edge high performance computing systems for a wide range of users, from the campus to the national research community. From the earliest IBM systems to today's ALPS cluster, NCHC has focused on providing innovative architectures designed to keep pace with the changing needs of science and engineering.