informatik-Kolloquium

Der Fachbereich Informatik der Johannes Kepler Universität Linz[1] lädt in Zusammenarbeit mit der Österreichischen Gesellschaft für Informatik (ÖGI) zu folgendem Vortrag ein:

Topic:	**What is actually needed to quantum-compute with harmonic oscillators?**
Presenter:	**Dr. Hoi-Kwan Lau** Max Planck Institute for the Physics of Complex Systems, Dresden, Germany
Datum:	**Tuesday, May 2nd 2017, 10:15**
Location:	**Johannes Kepler University Linz, K012 D**

Abstract: To implement quantum computers on harmonic-oscillator-liked systems, the conventional approach is to: 1) Cool the system to the ground state; 2) Specify two physical states as the encoding basis of a qubit; 3) Implement logic gates by engineering encoding-specific interaction. In our recent works, we show that all of these procedures are sufficient but not necessary. Specifically, we find a unified operation that can implement logic gates for any encoding [2]. The formalism permits a new class of encoding that a pure logical qubit is represented by a mixed physical state [1]. Because the purity of quantum system is not essential, the requirement of ground-state cooling can be relaxed. Additionally, our formalism can reduce the initialisation energy, and protect the logical qubit against a wider class of noise.

Reference:
[1] Hoi-Kwan Lau and Martin B. Plenio, arXiv:1608.03213
[2] Hoi-Kwan Lau and Martin B. Plenio, Physical Review Letters 117, 100501 (2016)

Short Bio: Dr. LAU Hoi-Kwan (Kero) is a visiting scientist at the Max Planck Institute for Physics of Complex Systems, Dresden Germany. He was a Croucher Postdoctoral Fellow at the University of Ulm, where he researched under the supervision of Prof. Martin Plenio. He received his PhD from the University of Toronto in 2014 with a thesis investigating the practicality of quantum information processing. Recently he proposed schemes for universal continuous variable quantum computation without cooling, and universal quantum computing with arbitrary continuous variable encoding (editor's suggestion in Physical Review Letters). He is the receiver of multiple awards and published more than 15 papers in high impact refereed journals.

Einladende: Univ.-Prof. Dr. Robert Wille, Dr. Alexandru Paler
Institut für Integrierte Schaltungen
Abteilung Integrierter Schaltungs- und Systementwurf

[1] Der Fachbereich (http://informatik.jku.at) besteht aus folgenden Instituten:
Application Oriented Knowledge Processing (FAW), Bioinformatics, Computational Perception, Computer Architecture, Applied Systems Research and Statistics, Computer Graphics, Formal Models and Verification, Networks and Security, Integrated Circuits, Pervasive Computing, Software Systems Engineering, System Software, Telecooperation, Signal Processing