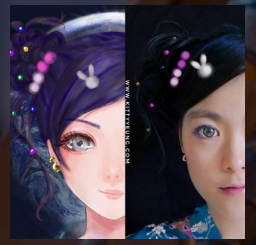
Introduction to Quantum Computing



Kitty Yeung, Ph.D. in Applied Physics

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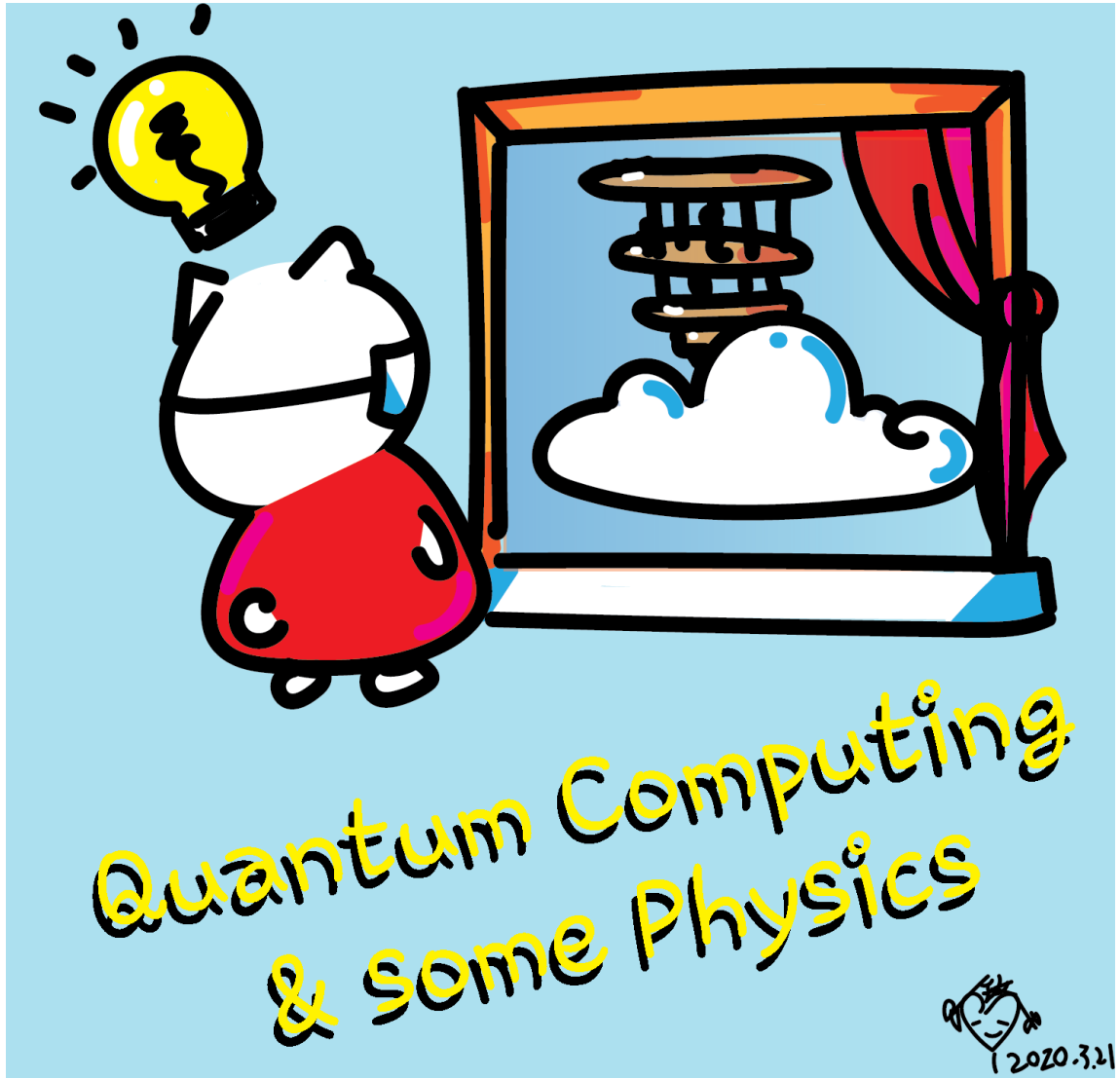
Nov 1, 2020
Hackaday, session 25
Guest lecture 5


2020.11.1.
SEASON
FINALE
f(x)

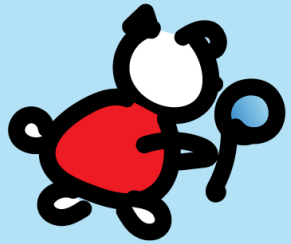
Class structure

- Comics on Hackaday – Quantum Computing through Comics every Sun
- 30 mins – 1 hour every Sun, one concept (theory, hardware, programming), Q&A
- Contribute to Q# documentation http://docs.microsoft.com/quantum
- Coding through Quantum Katas https://github.com/Microsoft/QuantumKatas/
- Discuss in Hackaday project comments throughout the week
- Take notes



THE SUNDAY SPECIALS

September 13
Prof. Terrill Frantz
Quantum Cryptography



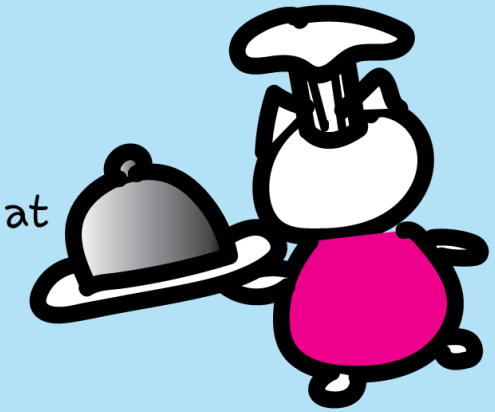
~~September 20~~ October 18 2pm PT
Prof. Chris Ferrie
Quantum Tomography

September 27
Rolf Huisman
Introducing the open source
Q# Community project qTRIL

October 11
Dr. Maria Schuld
Quantum Machine Learning

November 1
~~October 18~~
Dr. Michael Beverland
Quantum Error Correction

October 3
Kitty speaking at
Zen4Makers



Quantum Error Correction

- Why have you never experienced superposition in every day life, like a state of Schrodinger's cat being both dead and alive? The reason of course is that noise causes decoherence of the superposition state, collapsing it into either of the two parts of the two cases. To build a large-scale quantum computer we need special techniques to overcome these effects and protect the information from collapsing their precious superposition. Today we will cover the field of Quantum Error Correction which is tasked with this great challenge.
- Michael Beverland is a senior researcher in Microsoft Quantum, specializing in quantum error correction and fault tolerance. He did his postdoctoral work with Krysta Svore at Microsoft Research, his doctoral work with John Preskill at Caltech, and undergraduate studies in Cambridge, England. His research interests span the following topics: topological codes, universal quantum gates, scalable fault-tolerant quantum computing, code switching, noise models, and statistical mechanical approaches to quantum error correction.

Dr. Michael Beverland

Questions

- Post in chat or on Hackaday project https://hackaday.io/project/168554-quantum-computing-through-comics
- FAQ: Past Recordings on Hackaday project or my YouTube https://www.youtube.com/c/DrKittyYeung

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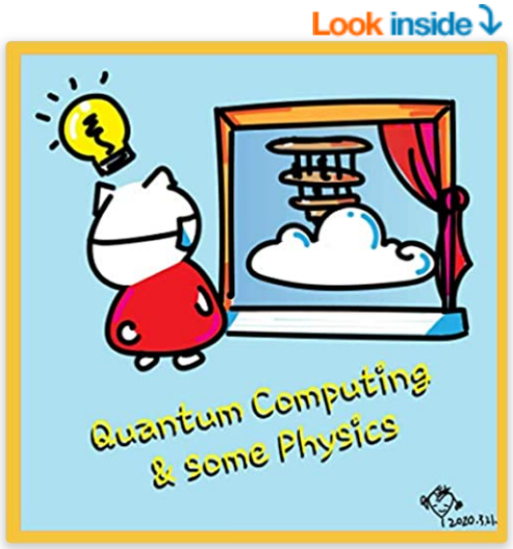

Quantum Computing & Some Physics: The Quantum Computing Comics Notebook

Paperback – September 3, 2020

by Dr. Kitty Yeung (Author)

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Learn about quantum computing through an intuitive series of comics. It is both a book and a notebook, in which readers can note down their thoughts on the back of the comics. The book provides a high-level guide to the basic concepts of quantum computing, linear algebra, and quantum algorithms. Commonly used quantum hardware architectures are also described in the comics. Learners at any age with any background can get something out of this comics. The

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- Comics on Hackaday – Quantum Computing through Comics

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Kitty Y. M. Yeung