Naomi Nickerson
PsiQuantum

Summary:

Practical universal quantum computing can only be achieved by applying methods of quantum error correction to protection against unavoidable noise in quantum systems. This series of talks will introduce the basic principles of quantum error correction, and what is needed for these theoretical concepts to be applied in real systems.

Quantum Error Correction and Fault Tolerance

1. Introduction to quantum error correction

This lecture will cover an introduction to the types of errors that occur in quantum systems, why they prevent successful quantum computation if left unchecked, and approaches to correcting these errors with small stabilizer codes.

2. Quantum error correction with the surface code

The second part of this series will look into detail at one particular error correcting code: the surface code. This is an example of a topological error correcting code, a class of error correction which is particularly well suited to practical applications.

3. Fault tolerance: quantum error correction for the real world

Finally, we will look at how the methods of error correction need to be modified to work in practical applications, when all the gates and measurements being used to implement error correction are also noisy.