Terry Rudolph
Faculty of Natural Sciences, Department of Physics
Imperial College London

Summary:

These lectures will introduce the basic physical principles of photonic quantum computing. We will then discuss how, because it can directly use the same large-scale silicon manufacturing processes that make your iPhone, it has become a leading candidate for building a 100 logical qubit quantum computer, comprising of roughly 1 million physical photonic qubits.

Photonic Quantum Computing

Lecture 1: Photons as carriers of quantum information

This lecture will introduce both the abstract formalism for describing the creation and manipulation of photons, as well as a discussion of some of the hardware which is used in practice to do so.

Lecture 2: Photons as qubits

This lecture will talk about using photons as qubits. It will also be an introduction to measurement-based quantum computing.

Lecture 3: Photons for fault tolerant quantum computing

This lecture will overview the significant challenges any architecture faces to create a fault tolerant quantum computer, with a focus on the various methods to address those challenges in a photonic platform.