All computer chips will have to consider the laws of quantum mechanics within the next 10 years, a Highline professor said at last week’s Science Seminar.

Science Seminar is a weekly set of presentations where faculty of Highline present on topics of interest and expertise unique to them.

Dr. Austin Roberts is a professor of mathematics, and spoke on the decreasing size of transistor chips in computers.

A transistor is a device that sends or switches an electronic signal to pass through a computer. It is the most basic unit of computers, Dr. Roberts said.

“As our devices get smaller, like our iPhones, we need less space between transistors,” Dr. Roberts said. “At 15 nanometers, we can’t go any closer without considering quantum mechanics.”

Last year, computer chip companies built the first 15-nanometer chip.

“Fifteen nanometers is the size of a toothpick for a bacteria,” Dr. Roberts said.

Classical computers work by passing binary code through a series of transistors to make information.

“Quantum computers work differently,” Dr. Roberts said. “They pass information through electrons, photons or ions.”

Each of these things exists in a state of sending a message 0 or 1, Dr. Roberts said. “This is called a qubit.”

Qubits can exist as both a zero, and one, and all values in between those numbers, Dr. Roberts said.

This requires that the ion or electron be in different positions and states of being at once.

The transistor receiving the ion plays a role in deciding how the qubit is received.

To demonstrate, Dr. Roberts brought stips of polarized, transparent plastic and held them up.

Polarized material only allows light to pass through that has a particular orientation.

If an electron wants to pass through this, it has to decide which to be, a 0 or a 1, Dr. Roberts said.

This happens, and a binary number is input to the computer.

Quantum computers can exploit this to hack classical computers, Dr. Roberts said.

“[A hacker] doesn’t have to guess one password at a time to access your account, he can guess all possibilities of passwords at once,” Dr. Roberts said.

This means that new security measures will have to be taken to combat quantum computing hacking attempts.

“The NSA is already adopting countermeasures, and we will have to soon,” Dr. Roberts said.

Science Seminar has come to a close for this quarter. It will not be offered in the summer, but will resume in the Fall. It is a one-credit science class, should students choose to register.