Evening Lecture:

INTRODUCTION TO QUANTUM COMPUTING

with Stephen Casey (NASA)

To take place during the

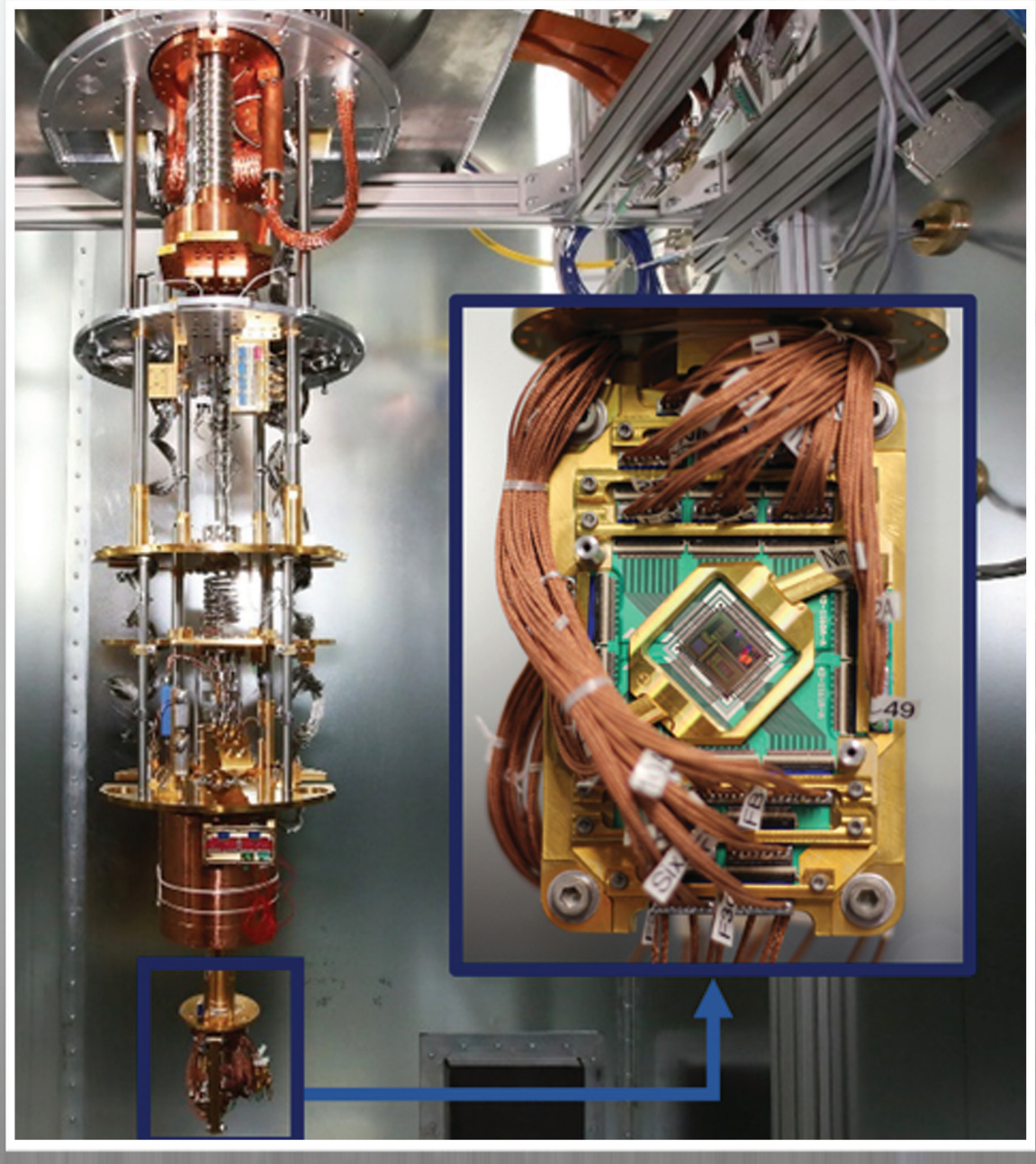
FUTURE TRENDS IN NUCLEAR PHYSICS COMPUTING WORKSHOP

WEDNESDAY, MARCH 16 7:30 P.M.

CEBAF CENTER ROOM F113

Abstract:

In recent years, quantum mechanics has played an increasing role in the development of efficient computing devices. Quantum computing is the field of inquiry that uses phenomena such as superposition, entanglement, and interference to operate on data represented by quantum states. Quantum computers can factor large numbers, search large databases, and perform Fourier transformations exponentially faster than allowed by the limits of classical computation. In addition, quantum encryption is theoretically unbreakable, and superdense coding can transmit more than one classical bit using only one qubit. While engineering these devices has been notoriously difficult, impressive progress has been made in recent years, and small-scale experiments implementing a few qubits are now operational. This talk will describe the basics of quantum computing theory and some of the applications, including quantum chemistry, simulation, and machine learning.



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