

**QCE: A Simulator for Quantum Computer Hardware**  
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Theoretical work on quantum computation usually assumes the existence of units that perform highly idealized unitary operations. However, in practice these operations are difficult to realize. Disregarding decoherence, a hardware implementation of a QC will perform unitary operations that are more complicated than those considered in most theoretical work. Therefore it is important to have theoretical tools to validate designs of physically realizable quantum processors. For this purpose we have developed a software tool called **Quantum Computer Emulator (QCE)**.

The **QCE** consists of a simulator of a generic, general purpose QC and a graphical user interface. **QCE** simulates the physical processes that govern the operation of the hardware quantum processor strictly according to the laws of quantum mechanics. The graphical user interface is used to control the simulator, to define the physical realization of the QC and to debug and execute quantum algorithms (QAs).

**QCE** can be used as a research tool to validate designs of physically realizable quantum processors and as an educational tool to learn about QCs and QAs in an interactive way. **QCE** is distributed as a self-installing executable, containing the program, documentation, and various quantum programs and can be downloaded from <http://www.compphys.org/quantum.htm>

Additional information can be found on

<http://www.compphys.org/quantum.htm>