**A primer on quantum computing for condensed matter physicists**

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Quantum computing is exploding across the world. I will describe some of the successes along with some of the open challenges needed to make it an effective tool for advancing condensed matter theory. Quantum simulation requires three important steps: (1) state preparation; (ii) state evolution in time; and (iii) measurement of the quantities of interest. As an example, I will describe how digital computation can be employed to determine many-body Greens functions. Along the way, I will sketch some of the key issues one must confront in performing quantum computation and describe some of the critical open problems we still need to solve to enable exciting science to be performed on these machines. Current hardware cannot do anything too sophisticated, but if it continues to advance at a rapid pace, this will soon change. What are the most exciting condensed matter physics problems that can be solved with those next generation machines? Will we be ready to take advantage of these new capabilities?