



Ciclo de Seminários

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Algorithms for Quantum Computers

In this talk, I will survey what can be computed by a quantum computer, from the first results in the field to recent developments. Currently, the most important known applications for quantum computers are:

- quantum computers will be able to simulate physical systems that are hard to simulate classically (with applications to materials and chemistry);
- quantum computers will be able to factor large numbers and, therefore, break the currently used public key cryptosystems such as RSA;
- quantum computers will provide speedup for a variety of search problems, from naive exhaustive search to finding the best move in 2 player games.

I will describe these three big applications, with an emphasis of search problems.

No previous knowledge of quantum computing or quantum physics will be assumed.

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Andris Ambainis holds B.Sc. (1996) and M.Sc. (1997) from University of Latvia and Ph.D. (2001) from University of California, Berkeley and has been a faculty member at the University of Latvia since 2007. He is one of the leading experts in the world in computer science aspects of quantum computing. He has made many important contributions, from quantum walks (quantum counterparts of random walks) as one of main methods for quantum algorithms to "quantum adversary" method for proving optimality of quantum algorithms. Andris Ambainis is a winner of an Advanced Grant from the European Research Council (ERC), the organization that funds the top European researchers. He is an author of over 100 research papers, including 18 papers in two leading Achievement Award.theoretical computer science conferences, FOCS and STOC.

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