Univerzita Karlova
Matematicko-fyzikální fakulta

Vás zve na

Strouhalovskou přednášku

Adiabatic Quantum Computers in 2017: Huge Advance or All Hype?

kterou přednese

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(Matematicko-fyzikální fakulta
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ve středu 1. března 2017 ve 14.00 hod.

v posluchárně Čeňka Strouhala (F1)
Praha 2, Ke Karlovu 5

Mark A. Novotny is a Fulbright Distinguished Chair at Charles University on the Faculty of Mathematics and Physics for the 2016-2017 academic year. Prof. Novotny was born in the US, earned his B.S. in Physics from North Dakota State U., and his Ph.D. in Physics in 1978 from Stanford U. He has been Professor and Head of the Dept. of Physics and Astronomy at Mississippi State U. since 2001, and since 2013 a W. L. Giles Distinguished Professor. Prof. Novotny has published more than 200 refereed papers, in areas ranging from materials physics to computer science to quantum devices. He is the inventor of a US patent entitled 'Fully Scalable Computer Architecture' and is the inventor of US provisional patents related to quantum dragon nanodevices and to quantum computers. He is a Fellow of the American Physical Society and also a Fellow of AAAS.

The availability of quantum annealing machines, also known as Adiabatic Quantum Computers (AQC), with about $N > 50$ qubits would be a disruptive technology. A qubit is a quantum superposition of the bits 0 and the 1 at the heart of all binary technology. The ability of an AQC to perform calculations impractical for *any* binary computer is why governments and companies (including Google) are making substantial investments in AQC. The company D-Wave Systems produces a quantum annealing machine with $N > 1000$ qubits. An introduction to AQC machines will be presented. Questions addressed will include whether current AQC technologies: are adiabatic? are quantum? are a computer? If AQC are not all hype, it is an impactful new tool. As with any new tool three things should be done: 1) test the current tool, 2) understand applications enabled by the availability of the current tool and future advanced tools, 3) work to improve next generations of the tool. All three will be addressed in this lecture, including tests and applications of the D-Wave 2X with $N > 1000$ qubits.