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In the frame of the PhD Course on 'Information Engineering', **Dr David E. Root** from Keysight Technologies, Santa Rosa (CA), will give the two following webinars

Google Meet Link <https://meet.google.com/kee-cnzj-ket>

Webinar #1, November 10th, 2020 17:30-17:00 (CET): Microwave Enabled Quantum Computation –

Quantum computation promises to transform society as profoundly as any previous technological revolution in human history. Certain computations that are completely intractable for present day and any conceivable future classical supercomputer may become practical by harnessing the immense power of quantum mechanics through the engineering and control of interacting two-level quantum bits, or qubits. Microwaves play a fundamental role in qubit state initialization, superposition, entanglement, general manipulation, and readout for implementing quantum algorithms, in many of the most promising qubit technologies (e.g. superconducting qubits based on Josephson junctions).

This talk introduces the exciting potential, basic principles, and significant technical challenges of practical quantum computation. The emphasis is on the fundamental role of microwaves and microwave engineering in the design and physical realization of quantum technologies. The emergence of a new “quantum engineering” discipline represents an exciting opportunity for the present and next generation of physical scientists, computer scientists, and microwave engineers.

Webinar #2, November 11th, 2020 17:30-17:00 (CET): Quantum Algorithms: A First Look

This lecture introduces the novel nature of quantum algorithms, assuming there is – in principle – a quantum computer able to execute them. In order to map classical logical operations to quantum dynamics for computation, classical logical operations must be extended to reversible form. Concepts of quantum amplitude amplification and quantum parallelism are introduced, as are schemes for encoding information in entangled qubits and teleporting quantum states that can't be copied. The concepts will be illustrated with examples of deterministic and probabilistic quantum algorithms, including the famous Grover quantum search algorithm.



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David E. Root received B.S. degrees in physics and mathematics, and the Ph.D. degree in physics, all from MIT. He is currently Research Fellow at Keysight Laboratories,

Keysight Technologies, Inc., Santa Rosa, CA, USA. Dr. Root is a well-known pioneer of measurement-based nonlinear device and behavioral modelling. Current interests include the physics and engineering of quantum information technology. He is the author or co-author of well over 100 peer-reviewed publications, four books, and multiple patents. He was a co-recipient of the 2007 IEEE ARFTG Technology Award and served as MTT-S Distinguished Microwave Lecturer from 2006-2008. David has been an IEEE Fellow since 2002.

