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# NANOSCIENCE COLLOQUIUM

## Atomic and Molecular Scale Functional Devices

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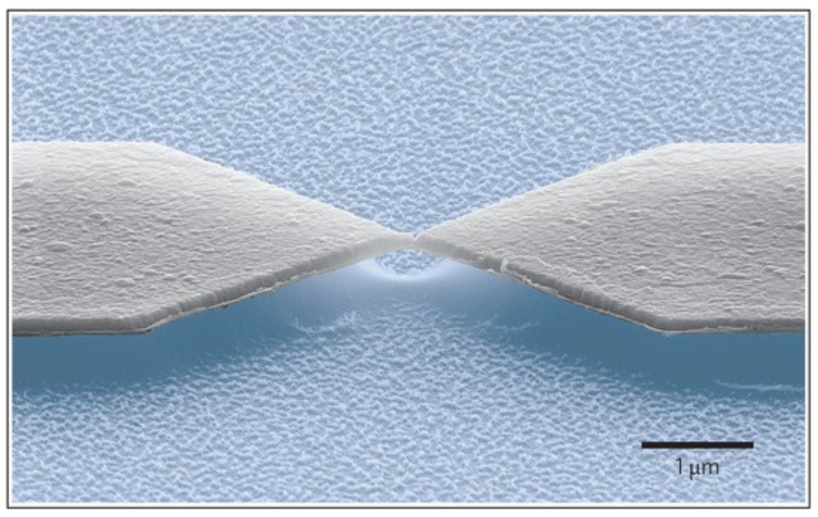
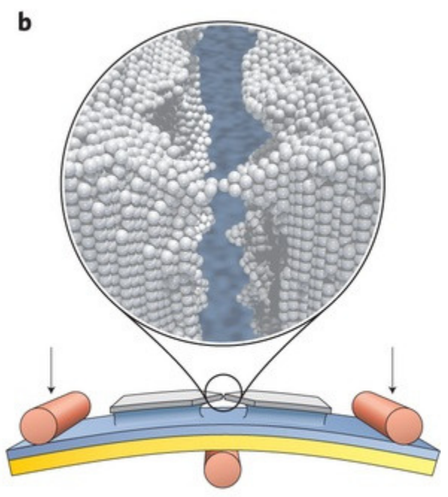
**Abstract:** The possibility to fabricate electronic devices with functional building blocks of atomic size is a major driving force of nanotechnology [1]. Key elements in microelectronics are reliable switches as well as ultimately small magnets that both can be operated as memory devices. Switches are usually realized by transistors, and these components have been miniaturized all the way down close to the atomic scale. However, at such scales three terminals, as required for transistors, are technically challenging to implement. Here I will first present an experiment in which a metallic atomic-size contact has been operated as a reliable and fatigue-resistant two-terminal switch. Current pulses are used to toggle the conductance between two well-defined values in the range of a few conductance quanta [2]. I will then address the question of the emergence of magnetism at the atomic scale and how it can be revealed by magnetoconductance measurements [3]. Finally, if time permits, I will discuss recent observations of magnetic-field tunable transport in organic radical molecules [4].

1. R. Waser, Nanoelectronics and Information Technology, (Wiley-VCH, Weinheim, 3rd edition 2012).
2. C. Schirm et al., Nature Nano. 8, 645 (2013)
3. F. Strigl et al., Nature Comm. 6, 7172 (2015), Phys. Rev. B 94, 144431 (2016)
4. R. Hayakawa et al., Nano Letters 16, 4960 (2016)

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