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Guest Lecture

Title:

“SiGe Self-Assembled Nanostructures: A Promising Host for Spin Qubits?”

Speaker: [Dr. Georgios Katsaros](#)

Address: Head of Nanoelectronics Group, Institute of Science and Technology Austria (IST Austria) Klosterneuburg

Date: Friday, 15th of April 2016

Time: 14:30

Place: Seminar Room CBEG02 (387, Photonics); Gußhausstraße 27

Abstract: Holes confined in group IV quantum dots are a promising option for the realization of spin qubits. Although studied much less than electrons [1], holes can have as well long spin lifetimes and dephasing times [2]. In addition due to their strong spin orbit coupling, they can be electrically manipulated. In our group we study holes which are confined in SiGe self-assembled nanostructures [3], realized by direct growth of Ge on Si substrates via the Stranski-Krastanow growth mode. In my talk I will focus mainly on transport measurements through so called Ge hut-wires (HWs), nanostructures with well-defined surfaces and growth orientations, with heights of about 2 nm and lengths exceeding one micrometer [4]. The obtained g-factors show a high in-plane and out-of-plane anisotropy which indicates the nature of the hole states to be heavy hole like [5]; such is important for achieving long spin coherence times. In order to move towards experiments determining the relaxation and coherence times charge sensors and double quantum dot devices are needed. Latest results in the realization of such devices will be presented.



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References:

- [1] Morello, A. et al. Nature 467, 687-691 (2010); Maune, B. M. et al. Nature 481, 344-347 (2012); Büch, H. et al. Nature Comm. 4 (2013); Simmons, C. B. et al. Phys. Rev. Lett. 106, 156804 (2011); Zwanenburg, F. A. Rev. Mod. Phys. 85, 961 (2013)
- [2] Y. Hu et al., Nature Nanotechnology 2, 622 (2007) ; Y. Hu et al., Nature Nanotechnology 7, 47-50 (2012) ; A. P. Higginbotham et al., Nano Letters 14, 3582 (2014)
- [3] Katsaros, G. et al., Nature Nanotechnology 5, 458-464 (2010); Katsaros, G. et al. , Phys. Rev. Lett. 107, 246601 (2011); Ares, N. et al., Phys. Rev. Lett. 110, 046602 (2013)
- [4] Zhang, J. J. et al. Phys. Rev. Lett. 109, 085502 (2012); Watzinger, H. et al. APL Mater. 2, 076102 (2014) [5] Watzinger, H. et al. (in preparation)

Contributions by:

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