

Andreas Muller

Assistant Professor of Physics
University of South Florida
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Education

Ph. D. in Physics, May 2007
University of Texas at Austin
Dissertation title: "Resonance fluorescence and cavity-quantum electrodynamics with quantum dots"

B.S. in Physics, May 2001
University of Texas at Austin (Honors)

Vordiplom Physik, Aug. 1999
Technische Universität München, Munich, Germany

Research Interests

- Coherent control and quantum optics of solid-state nanostructures
- Optical spectroscopy of discrete semiconductor nanostructures, incl. quantum dots, impurity centers and other mesoscopic structures
- Solid-state cavity quantum electrodynamics for novel nano-photonic devices incl. few emitter lasers, single-photon sources and elementary solid-state quantum information processing

Experience

Assistant Professor of Physics
University of South Florida
August 2010 – present

Post Doctoral Researcher
Joint Quantum Institute / University of Maryland and the National Institute of Standards and Technology (NIST)
Mentor: Dr. Glenn Solomon.
August 2007 – July 2010
Project: Quantum dot-based polarization-entangled photon sources

Graduate Research Assistant
University of Texas at Austin
Mentor: Dr. Chih-Kang Shih
October 2001- May 2007
Project: Resonance fluorescence and cavity-quantum electrodynamics with quantum dots (Physics dept. outstanding dissertation award)

Awards

NSF CAREER Award
"Interfacing Remote Quantum Dot Nanostructures by Resonant Light Scattering"

Publications:

Journal papers only (reverse chronological order)

- (27) B. Petrak, N. Djeu, and A. Muller, “Purcell-enhanced Raman scattering from atmospheric gases in a high-finesse microcavity”, *Under review*.
- (26) K. Konthasinghe, M. Peiris, Y. Yu, M. F. Li, J. F. He, L. J. Wang, H. Q. Ni, Z. C. Niu, C. K. Shih, and A. Muller, “Field-Field and Photon-Photon Correlations of Light Scattered by Two Remote Two-Level InAs Quantum Dots on the Same Substrate”, *Phys. Rev. Lett.* **109**, 267402 (2012).
- (25) G. Zhao, Y. Zhang, D. G. Deppe, K. Konthasinghe, and A. Muller, “Buried heterostructure vertical-cavity surface-emitting laser with semiconductor mirrors”, *Appl. Phys. Lett.* **101**, 101103 (2012).
- (24) K. Konthasinghe, J. Walker, M. Pereis, C. K. Shih, Y. Yu, M. Li, J. He, L. Wang, H. Ni, Z. Niu, and A. Muller, “Coherent versus Incoherent Light Scattering from a Quantum Dot”, *Phys. Rev. B.* **85**, 235315 (2012).
- (23) B. Petrak, K. Konthasinghe, S. Perez, and A. Muller, “Feedback-controlled laser fabrication of micromirror substrates”, *Rev. Sci. Instr.* **82**, 123112 (2011).
- (22) S. V. Polyakov, A. Muller, A. Ling, N. Borjemscaia, E. B. Flagg, E. Van Keuren, A. L. Migdall, and G. S. Solomon, “Coalescence of Single Photons Emitted by Disparate Single-Photon Sources: The Example of InAs Quantum Dots and Parametric Down-Conversion Sources”, *Phys. Rev. Lett.* **107**, 157402 (2011).
- (21) M. Metcalfe, S. Carr, A. Muller, G. S. Solomon, and J. Lawall, “Resolved sideband emission from dynamically strained quantum dots”, *Phys. Rev. Lett.* **105**, 037401 (2010).
- (20) A. Muller, E. B. Flagg, J. Lawall, and G. S. Solomon, “Ultrahigh finesse Fabry-Perot microcavity with small mode volume”, *Optics Lett.* **35**, 2293 (2010).
- (19) E. B. Flagg, A. Muller, S.V. Polyakov, A. Ling, A. L. Migdall, and G. S. Solomon, “Two-Photon Interference From Separate Quantum Dots”, *Phys. Rev. Lett.* **104**, 137401 (2010).
- (18) A. Muller, E. B. Flagg, M. Metcalfe, J. Lawall, and G. S. Solomon, “Coupling an epitaxial quantum dot to a fiber-based external-mirror microcavity”, *Appl. Phys. Lett.* **95**, 173101 (2009).
- (17) M. Metcalfe, A. Muller, G. S. Solomon, and J. Lawall, “Active feedback of a Fabry-Perot cavity to the emission of a single InAs/GaAs quantum dot”, *J. Opt. Soc. Am. B.* **26**, 2308 (2009).
- (16) A. Muller, W. Fang, J. Lawall, and G. S. Solomon, “Creating Polarization-Entangled Photon Pairs from a Semiconductor Quantum Dot Using the Optical Stark Effect”, *Phys. Rev. Lett.* **103**, 217402 (2009).

- (15) A. Muller, W. Fang, J. Lawall, and G. S. Solomon, "Emission spectrum of a dressed exciton-biexciton complex in a semiconductor quantum dot", *Phys. Rev. Lett.* **101**, 027401 (2008).
- (14) T. Tran, A. Muller, C. K. Shih, P. S. Wong, G. Balakrishnan, N. Nuntawong, J. Tatebayashi, and D. L. Huffaker, "Single dot spectroscopy of site-controlled InAs quantum dots nucleated on GaAs nanopramids", *Appl. Phys. Lett.* **91**, 133104 (2007).
- (13) E. B. Flagg, A. Muller, J. W. Robertson, S. Founta, D. G. Deppe, M. Xiao, W. Ma, G. J. Salamo, C. K. Shih, "Resonantly driven coherent oscillations in a solid-state quantum emitter", *Nat. Phys.* **5**, 203 (2009).
- (12) A. Muller, E. B. Flagg, P. Bianucci, X. Y. Wang, D. G. Deppe, W. Ma, J. Zhang, G. J. Salamo, M. Xiao, and C. K. Shih, "Resonance Fluorescence From a Coherently-Driven Semiconductor Quantum Dot in a Cavity", *Phys. Rev. Lett.* **99**, 187402 (2007).
- (11) A. Muller, D. Lu, J. Ahn, D. Gazula, S. Quadery, S. Freisem, D.G. Deppe and C.K. Shih, "Buried All-Epitaxial Microcavity for Cavity-QED with Quantum Dots", *Nano Lett.* **6**, 2920 (2006). See also: research highlight, *Nature Photonics* **1**, 79 (2007).
- (10) Q.Q. Wang, A. Muller, M.T. Cheng, H.J. Zhou, P. Bianucci, and C.K. Shih, "Internal and external polarization memory loss in single quantum dots", *Appl. Phys. Lett.* **89**, 142112 (2006).
- (9) A. Muller, C.K. Shih, J. Ahn, D. Gazula, and D.G. Deppe, "High Q (33 000) all-epitaxial microcavity for quantum dot vertical-cavity surface-emitting lasers and quantum light sources", *Appl. Phys. Lett.* **88**, 031107 (2006).
- (8) J. W. Keto, M. E. Becker, D. Kovar, G. Malyavanatham, A. Muller, D. T. O'Brien, C. K. Shih, J. Wang, "Nanoparticles of Er-doped glass produced by laser ablation of microparticles", *J. Opt. Soc. B* **23**, 1581 (2006).
- (7) A. Muller, C.K. Shih, J. Ahn, D. Lu, and D.G. Deppe, "Isolated single quantum dot emitters in all-epitaxial micro-cavities", *Opt. Lett.* **31**, 528 (2006).
- (6) A. Muller, P. Bianucci, C. Piermarocchi, M. Fornari, I.C. Robin, R. André, and C.K. Shih, "Time-Resolved Spectroscopy of Individual Impurity Centers in ZnSe", *Phys. Rev. B* **73**, 081306(R) (2006).
- (5) Q.Q. Wang, A. Muller, M.T. Cheng, H.J. Zhou, P. Bianucci, and C.K. Shih, "Coherent Control of a V-Type Three-Level System in a Single Quantum Dot", *Phys. Rev. Lett.* **95**, 187404 (2005).
- (4) Q.Q. Wang, A. Muller, P. Bianucci, C.K. Shih, and Q.K. Xue, "Quality factors of qubit rotations in single semiconductor quantum dots", *Appl. Phys. Lett.* **87**, 031904 (2005).

(3) Q.Q. Wang, A. Muller, P. Bianucci, E. Rossi, Q. K. Xue, T. Takagahara, C. Piermarocchi, A.H. MacDonald, and C.K. Shih, “Decoherence processes during optical manipulation of excitonic qubits in semiconductor quantum dots”, *Phys. Rev. B* **72**, 035306 (2005).

(2) P. Bianucci, A. Muller, Q.Q. Wang, C. Piermarocchi, and C.K. Shih, “Experimental realization of the one qubit Deutsch-Jozsa algorithm in a quantum dot”, *Phys. Rev. B* **69**, 161303(R) (2004).

(1) A. Muller, Q.Q. Wang, P. Bianucci, C.K. Shih and Q.K. Xue, “Determination of anisotropic dipole moments in self-assembled quantum dots using Rabi oscillations”, *Appl. Phys. Lett.* **84**, 981 (2004).

Patents:

Non-provisional Patent, N. Djeu and A. Muller, “Microcavity Raman Sensor and Method of Use”, Serial Number 61/505,270, filed: July 7, 2012.