



**Dr. Jeffrey R. Guest**

*Assistant Scientist*

Theme: Electronic and Magnetic  
Materials & Devices

Phone: 630-252-7073

Fax: 630-252-4646

E-mail: jrguest@anl.gov

Argonne National Laboratory  
Center for Nanoscale Materials  
9700 S. Cass Ave., Building 440  
Argonne, IL 60439-4806

Ph.D., University of Michigan

**Research Summary:**

Our experimental research focuses on studying optical interactions with nanoscale structures along three basic threads, including (i) exploring the limits of electronic and spin quantum coherence in nanoscale systems at surfaces, (ii) measuring optical, mechanical and transport properties with light, and (iii) developing atomic scale control by interfacing laser spectroscopy with ultra-high-vacuum scanning tunneling microscopy. In addition to developing a low temperature NSOM and measuring absorption and coherence properties of single quantum dots, my previous work has included demonstrating laser-cooling and trapping of radioactive atoms and atoms in strong magnetic field environments, and performing laser spectroscopy and coherent optical manipulation of laser-cooled atoms.

**Selected Recent Publications:**

“Near-field coherent spectroscopy and microscopy of a quantum dot system”, J. R. Guest, T. H. Stievater, Gang Chen, E. A. Tabak, B. G. Orr, D. G. Steel, D. Gammon, D. S. Katzer, *Science* **293**, 2224 (2001).

“Measurement of optical absorption by a single quantum dot exciton”, J. R. Guest, T. H. Stievater, Xiaoquin Li, Jun Cheng, D. G. Steel, D. Gammon, D. S. Katzer, D. Park, C. Ell, A. Thranhardt, G. Khitrova, H. M. Gibbs, *Phys. Rev. B* **65**, 241310R (2002).

“Coherent population transfer of ground state atoms into Rydberg states”, T. Cubel, B. K. Teo, V. Malinovsky, J. R. Guest, A. W. Reinhard, B. Knuffman, P. R. Berman, G. Raithel, *Phys. Rev. A* **72**, 023405 (2005).

“Laser cooling and magnetic trapping at several Tesla”, J. R. Guest, J.-H Choi, E. Hansis, A. P. Povilus, G. Raithel, *Phys. Rev. Lett.* **94**, 073003 (2005).

“Laser trapping of  $^{225}\text{Ra}$  and  $^{226}\text{Ra}$  with repumping by room-temperature blackbody radiation”, J. R. Guest, N. D. Scielzo, I. Ahmad, K. Bailey, J. P. Greene, R. J. Holt, Z.-T. Lu, T. P. O’Connor, D. H. Potterveld, *Phys. Rev. Lett.* **98**, 093001 (2007).