



Dr. Jeffrey R. Guest
Assistant Scientist, Physicist

Electronic and Magnetic Materials &
Devices Group
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

Research summary:

As an experimental physicist, I am interested in the electronic, magnetic, and particularly optical properties of molecular and nanoscale structures that we can understand and control at the atomic scale, such as single atoms or molecules, functionalized graphene and self-assembled molecular heterojunctions. To achieve this, we are combining low temperature ultra-high-vacuum scanning tunneling microscopy (UHV STM) and confocal optical microscopy to explore (*i*) graphene-based nanophotonics, (*ii*) photophysics of molecular acceptor-donor complexes, (*iii*) nanoplasmonics and tip-enhanced laser spectroscopies, and (*iv*) the limits of electronic and spin quantum coherence in nanoscale systems at surfaces. I am also developing and using interferometric laser microscopy techniques to measure nanomechanical dynamics of nanofabricated and self-assembled structures.

Selected publications:

“Emergence of excited-state plasmon modes in linear hydrogen chains from time-dependent quantum mechanical methods”, A. E. DePrince III, M. Pelton, J. R. Guest, S. K. Gray, *Phys. Rev. Lett.* **107**, 196806 (2011).

“Graphene on Cu(111)”, L. Gao, J. R. Guest, N. P. Guisinger, *Nano Letters* **10**, 3512 (2010).

“Patterning graphene at the nanometer scale via hydrogen desorption”, P. Sessi, J. R. Guest, M. Bode, N. P. Guisinger, *Nano Letters* **9**, 4343 (2009).

“Temperature and size dependence of anti-ferromagnetism in Mn nanostructures”, P. Sessi, N. P. Guisinger, J. R. Guest, M. Bode, *Phys. Rev. Lett.* **103**, 167201 (2009).

“Laser trapping of ^{225}Ra and ^{226}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).

“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).

“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).