



AMO physics/QUANTUM OPTICS SEMINAR

Title: High Resolution Positron Scattering from Atoms and Molecules*

Speaker: Joan Marler
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Time: Wednesday, July 25 at 11:15

Place: 1525-323

Abstract:

For more than half a century after the experimental discovery of the positron in 1932, positron scattering experiments lagged behind analogous experiments with electrons. However around 1997, the development of a buffer gas trap to cool positrons from a radioactive source resulted in a positron source with an energy spread of 25 meV or better, tunable from 0.1 to 100 eV. This has consequently expanded the energy regime open for study in positron scattering experiments so that it is comparable to that which is possible in electron scattering experiments. I will discuss how this approach has been implemented at the University of California, San Diego including discussion of positron trapping, beam formation and techniques for making scattering measurements in a strong magnetic field. I will then present results for a variety of elastic and inelastic scattering cross sections with atoms and molecules, including the first state specific vibrational and electronic excitation cross sections for positrons. I will also present results for processes that are unique to positrons, i.e. direct annihilation and positronium formation. Then as we mark the 75th year since the experimental discovery of the positron, I will address the future of positron scattering. Specifically, I will discuss a new high field positron trap coming on-line at UCSD and some applications for low-energy positrons, (e.g. in material science and cold anti-hydrogen.)

*Work done in collaboration with C. M. Surko at the University of California, San Diego.

Michael Drewsen