Low Energy Positron: An Ideal Particle for Studying Surface Structure

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For over five decades, scientists have interrogated the structure of surfaces using an array of particles: electrons, photons, atoms, ions, etc. However, an ideal probe for surface structure should possess two basic properties:

1) that the particle should have a very short mean free path (<10 Å) so it is very sensitive to the top 3-5 atomic layers of a solid;

2) that the particle should scatter weakly with atoms so that the measured spectra can be easily simulated by theory or directly inverted to obtain surface structure.

In this talk, I shall explore the unique properties of slow positrons and discuss its potential in determining surface structure. The use of slow positron diffraction and positron holography will be covered. In particular, direct comparisons will be made with low energy electron diffraction. The talk will also cover my relationship with Lester Germer, the co-discoverer of low energy electron diffraction.