

**Plenary Talk**

PV XII Wed 9:45 RW 1

**Passive 300 Attosecond Pulses and the Breakdown of the Single Active Electron Approximation** — •PAUL CORKUM<sup>1</sup>, DONG HYUK KO<sup>1</sup>, and GRAHAM GARDINER BROWN<sup>2</sup> — <sup>1</sup>Joint Attosecond

Science Laboratory, University of Ottawa and National Research Council Canada, 25 Templeton Street, Ottawa, Ontario, Canada K1N 6N5 — <sup>2</sup>Max Born Institute, Max-Born StraÙe 2A, D-12489 Berlin, Germany

When one irradiates a system with intense infrared light, an electron can tunnel. Usually, but not always, the hole stays in place. If the hole is static, only one electron is involved, but, in xenon, we create a superposition of states in the ion. Any coherent superposition of states

describes a hole wave packet that moves through the atomic core. Any imbalance in the superposition also creates a static hole.

Using the perturbed trajectory measurement method we observe the spin-orbit motion in the emitted radiation. Surprisingly, we find that even the very high frequency light (that gains cross section from the 4D giant plasmon resonance) shows spin-orbit wave packet dynamics. The timing is shifted from the timing of radiation where there is no hole motion, but only by a small amount.

The most important observation is that the ion contributes substantially to the photon energy of these 90 eV photons. The ion contribution can even exceed the recollision electron's kinetic energy at the moment of recollision.