

Figure 3: Energy spectra of electrons for different phase shifts (180 degree and zero degree). At a phase shift of 180 degree pronounced equidistant maxima are observed, whereas there is no interference structure for zero degree. The inserts explain the physical processes: In the left picture electrons with high energies are emitted at two time intervals (red ellipse) during the pulse which leads to the quantum mechanical interference pattern of the spectrum. Instead, in the right picture electron emission is possible only once per pulse. Therefore no interference can occur. In this case, however, the electrons gain on average more kinetic energy, and the number of electrons at higher energies is larger. The shallow slope of the curve between 5eV and 10eV (especially at zero degree) indicates back scattering in the laser field.

