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Longitudinal Momentum of Electron at the Tunneling Exit[1] TAO LI, Beijing Computational Science Research Center, XU WANG, Graduate School of China Academy of Engineering Physics — The longitudinal momentum of the electron at the exit of tunneling ionization is an important parameter to make sense of the tunneling process. It is usually assumed to be zero, but recent experiments show that some nonzero values must be included in order to explain the measured electron spectra. Here we try to shed some light on this topic by numerically solving the time-independent Schrödinger equation(TISE) and the time-dependent Schrödinger equation(TDSE) of an atom in strong laser fields. We look for longitudinal momentum, defined as the derivative of the phase of the wave function, at the position of the tunneling exit. We find that the longitudinal momentum is nonzero even in the adiabatic (static) limit. And nonadiabaticity may further increase this momentum, especially for weak laser field strengths.

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