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Longitudinal Momentum of the Electron at the Tunnelling Exit

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The longitudinal tunnelling-exit momentum of the electron in strong-field tunnelling ionization is shown to be nonzero even in the static or the adiabatic limit. This nonzero momentum is a purely quantum mechanical effect determined by the shape of the wave function in the vicinity of the tunnelling-exit point. Nonadiabaticity or finite wavelength may increase this momentum substantially, and the detailed value depends on both the atomic and the laser parameters.

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