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A classical model of channel-closing effects on strong-field ionization[1] B.A. DEHARAK, V.C. VITERI-PFLUCKER, B. KOIRALA, Y.A. ELMADNY, Illinois Wesleyan University, D. CHETTY, Griffith University, R.D. GLOVER, University of Adelaide, I.V. LITVINYUK, R.T. SANG, Griffith University — Atoms in strong laser fields can ionize by absorbing energy from multiple photons so that an electron has sufficient energy to escape (multi-photon ionization), or by having the depth of its potential well lowered enough that an electron has a significant chance of tunneling out through the barrier (tunnel ionization). One might expect that as the intensity of the laser field increases, the probability that the atom will ionize increases until an intensity is reached that guarantees ionization. However, as the intensity increases the ground state of the atom is stark shifted so that a greater amount of energy is required for ionization to occur. In the multi-photon ionization model this shifting of the ground state energy results in a point being reached where the minimum number n of photons that must be absorbed has increased to $n+1$ (the ionization channel that corresponds to n photon absorption has closed). The probability of absorbing $n+1$ photons is much lower than for absorbing n photons, so the probability of ionization decreases as the intensity increases past this point. Here we present a classical model of the effects of channel closing on ionization probabilities, and apply it to simulate strong-field experiments on argon.

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