

## **Attoclock: shining new light on old questions in quantum mechanics**

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Novel time-resolved attosecond streaking techniques are currently being applied in an attempt to answer a very fundamental questions in quantum mechanics, such as how fast can light remove a bound electron from an atom or a solid? Furthermore, the question of how long a tunneling particle spends inside the barrier has remained unresolved since the early days of quantum mechanics. The main theoretical contenders, such as the Buttiker-Landauer, the Eisenbud-Wigner (also known as Wigner-Smith), and the Larmor time give different answers. Yet recent attempts at reconstructing valence electron dynamics in atoms and molecules have entered a regime where the tunneling time genuinely matters. We used the attoclock technique to measure the tunneling delay time in strong laser field ionization of helium and reveal a real and not instantaneous tunneling time. The matching theoretical model predicts a strong implications on the investigation of electron dynamics in attosecond science, because a significant delay must be taken into account about when the electron hole dynamics begin to evolve.