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Electron scattering from excited states of H: derivation of the ionization threshold law AARON TEMKIN, NASA/Goddard Space flight Center, JANINE SHERTZER, College of the Holy Cross — The titled elastic scattering wave function is the final state in the matrix element for excitation of that (N) state. In the T-P model [1] wherein only radial correlations are included, the potential is dominated by the Hartree potential for the Nth state. The solution and the matrix element are derived as a function of N and the total energy (E). Because the analytic continuation is complex, $N \to 1/i\sqrt{\varepsilon}$, where ε is the energy of the ionized electron, the ionization threshold law acquires an exponential factor $\{Q(E) \propto E^{3/2} \exp[-\pi\sqrt{8/3}/\sqrt{E}]\}$. That factor completely overwhelms $E^{3/2}$ in the limit$E \to 0$. This result is qualitatively similar to that of Ref. [2], $Q_{MI}(E) \propto \exp[-6.87/(E/2)^{1/6}]$. That comparison and other implications of the law will be discussed.

[1] A. Temkin, Phys. Rev. **126**, 130 (1962), R. Poet, J. Phys. B **11**, 3081 (1978).
[2] J. H. Macek and W. Ihra, Phys. Rev. A**55**, 2024 (1997).

Aaron Temkin
NASA/Goddard Space Flight Center

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