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Indirect double photoionization of water[1] T.N. RESCCIGNO, H. SANN, A.E. OREL, R. DÖRNER — The vertical double ionization thresholds of small molecules generally lie above the dissociation limits corresponding to formation of two singly charged fragments. This gives the possibility of populating singly charged molecular ions by photoionization in the Franck-Condon region at energies below the lowest dication state, but above the dissociation limit into two singly charged fragment ions. This process can produce a superexcited neutral fragment that autoionizes at large internuclear separation. We study this process in water, where absorption of a photon produces an inner-shell excited state of H_2O^+ that fragments to H^++OH*. The angular distribution of secondary electrons produced by OH* when it autoionizes produces a characteristic asymmetric pattern that reveals the distance, and therefore the time, at which the decay takes place.

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