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On the role of multiple hot electron processes in STM-induced atom motion on surfaces J. W. GADZUK, NIST — The phenomenon of adsorbed atom excitation/manipulation induced by hot-electrons delivered to the surface by an STM tip is related to desorption induced by multiple electron transition (DIMET) processes in which femtosecond laser pulses excite substrate electrons, creating a flux of hot electrons incident upon the surface from within rather than externally as occurs with the STM. While the sources of the hot electrons differ, the individual inelastic electron scattering processes giving rise to atomic motion over activation barriers are identical. This facilitates an adaptation of DIMET theory [1] to multiple-electron STM surface processing. Recent relevant experiments: i) STM-induced non-local hot electron dissociation of dimethyldisulfide on Au (111) by Maksymovych and Yates; ii) "below-one-electron-threshold" excited motion of single Co atoms on Cu (111) by Stroscio and coworkers will be considered in the light of a DIMET-based theory that focuses on special aspects of multiple excitation processes. [1] J. W. Gadzuk, Chem. Phys. Vol.251, 87 (2000).

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