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Two-dimensional model of resonant electron collisions with diatomic molecules and molecular cations. MARTIN VANA, DAVID HVIZDOS, KAREL HOUFEK, Charles Univ, ROMAN CURIK, UFCH JH, CHRIS H GREENE, Purdue University, THOMAS N RESCIGNO, LBNL, C WILLIAM MCCURDY, UC Davis LBNL — A simple model for resonant collisions of electrons with diatomic molecules with one electronic and one nuclear degree of freedom (2D model) which was solved numerically exactly within the time-independent approach [1] was used to probe the local complex potential approximation and nonlocal approximation to nuclear dynamics of these collisions [2]. This model was reformulated in the time-dependent picture and extended to model also electron collisions with molecular cations, especially with H_2^+. This model enables an assessment of approximate methods, such as the boomerang model or the frame transformation theory. We will present both time-dependent and time-independent results and show how we can use the model to extract deeper insight into the dynamics of the resonant collisions. [1] K. Houfek, T.N. Rescigno, C.W. McCurdy, Phys. Rev. A 73 (2006) 032721 [2] K. Houfek, T.N. Rescigno, C.W. McCurdy, Phys. Rev. A 77 (2008) 012710

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