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Time delay of slow electrons by a diatomic molecule described by non-overlapping atomic potentials model. MIRON AMUSIA, Hebrew Univ of Jerusalem; Ioffe Phys.-Tech. Institute, ARKADIY BALTENKOV, Arifov Institute of Ion-Plasma and Laser Technologies — We study the elastic scattering of slow electrons by two-atomic molecule in the frame of non-overlapping atomic potentials model. The molecular continuum wave function is represented as a combination of a plane wave and two spherical s-waves, generated by the centers of atomic spheres. The asymptotic of this function determines in closed form the amplitude of elastic electron scattering. We show that this amplitude cannot be represented as a series of spherical functions. Therefore, it is impossible to use straightly the usual S-matrix methods to determine the scattering phases for non-spherical targets. We show that far from molecule the continuum wave function can be presented as an expansion in other than spherical orthonormal functions. The coefficients of this expansion determine the molecular scattering phases for non-spherical molecular systems. We calculated the scattering phases in the framework of an analytically solvable model and demonstrated the internal fundamental shortcoming of existing approaches. In the frame of the suggested approach, we calculate the Wigner times delay for slow electron scattered by two-atomic target. In principle, our approach can be easily generalized, thus permitting consideration of a multi-atomic molecule as a scattering target. .

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