**Calculation of transition amplitude in two levels systems by application of an adiabatic approximation**

M. Kurtovic1, H. Delibasic Markovic1, I. Petrovic2 and V. Petrovic1

1*Faculty of Science, University of Kragujevac, Serbia*

2*Academy of Professional Studies Sumadia, Department in Kragujevac, Serbia*

e-mail: kurtovicmaida@gmail.com

In this paper, we will analyze the transition between atomic states of neon under the influence of an adiabatic approximation. We examined transition in two-level systems because the majority of the semiclassical calculations can be brought to a final result [1-3]. This was achieved using the well-known equation for transition amplitude [4]: , where is the distance between levels, denotes the point on the real-time axis and is the upper half-plane of complex time that satisfies equality between the initial, , and the final, , energies [5]: . To compare our results with other theoretical and experimental findings [6-8], we included the influence of the perturbated ionization potential in our investigation. In addition, we performed calculations with linear and time-dependent laser profiles. Our results clearly indicated that change of the above-mentioned parameters, i.e., perturbation of ionization potential and change of the laser pulse, significantly influences the transition amplitude of ejected photoelectrons.

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