Book of abstracts

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28 August – 1 September 2017

Belgrade, Serbia

Editors

Marina Lekić and Aleksandar Krmpot

Institute of Physics Belgrade, Serbia

Belgrade, 2017

ABSTRACTS OF TUTORIAL, KEYNOTE, INVITED LECTURES, PROGRESS REPORTS AND CONTRIBUTED PAPERS

of

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Effect of the Corrected Ionization Potential on the High-Harmonic Generation transition rate in a linearly polarized laser field

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Abstract: In this paper we theoretically described the influence of the ponderomotive and the Stark shift [1,2] on the high-order harmonic generation's transition rate (HHG rate) for the cases of noble and alkali atoms. To describe harmonic generation we used the analytical formula by Frolov et al. [3] which is derived for a weakly bound electron in the tunneling limit and modified it in way to include mentioned effects. Firstly, we assumed the general beam shape in nonrelativistic, linearly polarized laser field. We showed that the inclusion of these effects affects the HHG rate. For the same conditions, the intensity of the alkali harmonics were considerably weaker compared to the intensity of noble harmonics [4]. Also, the Stark shift for the alkali atoms induces not only decrease of the peak heights i.e. decrease of the ionization yield, but also the peak broadening. At the end, we analyzed the influence of the beam shape on the behavior of obtained theoretical curves. We considered two types of profiles of laser radiation, Gaussian and Lorentzian [5,6]. It is shown that the HHG rate depends on the spatial distribution of laser beam profiles.

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Energy distribution of ejected photoelectrons in $K^{-2}V$ process

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Abstract: In the last few years, a great deal of attention has been devoted to Double-Core-Hole states, and especially those involving K-shells, K^{-2}states, as well as, $K^{-2}V$ states, which consider simultaneous core ionization and core-excitation [1]. In this paper we have given a theoretical framework that enables prediction of the energy distribution of ejected photoelectrons in $K^{-2}V$ process. In order to achieve this, we obtained a formula for the transition rate taking into account the channels of sequential and nonsequential ionization, and ionization with ionic core excitation, i.e. we treated the ionization rate as a cumulative contribution of simultaneous processes, ionization and excitation [2,3]. We assumeda non-relativistic domain and linearly polarized laser field. We started with the $K^{-2}V$ process in helium like atoms and showed that inclusion of additional processes significantly influences the transition rate and at the same time the energy distribution of the ejected photoelectrons, especially in the energy range of the ejected photoelectrons bringing us to the energy range of low energy electrons which have a significant role in bio damage [4].

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