

PHOTOIONIZATION OF HYDROGEN MOLECULAR ION BY ULTRASHORT PHOTO-PULSE

Arkhipov D.N., Astashkevich S.A., Mityureva A.A., Smirnov V.V.
Faculty of Physics, St. Petersburg State University, Russia, 198504,
E-mail: valery_smirnov@mail.ru

The probabilities of photoionization of hydrogen molecular ion by ultrashort laser field were evaluated on base of earlier developed trajectory method.

The process of photoionization of hydrogen molecular ion in ultrashort laser field was considered. The process may be of interest, for example, in astrophysical plasma. The trajectory-based method for evaluating transition probabilities developed in our works [1, 2] has been used. The method is nonperturbative and takes into account all orders of multiphoton and recollision processes. The photoionization probabilities were calculated in a wide range of field frequencies and intensities. This is unique capabilities compared to the other methods.

We consider a plane-wave photo-pulse with linear polarization and a Gaussian modulation. The result in a weak field is usually represented in a form of cross section. Gained hydrogen molecular ion photoionization cross section averaged over molecular orientation for equilibrium internuclear distance is shown in Fig. 1.

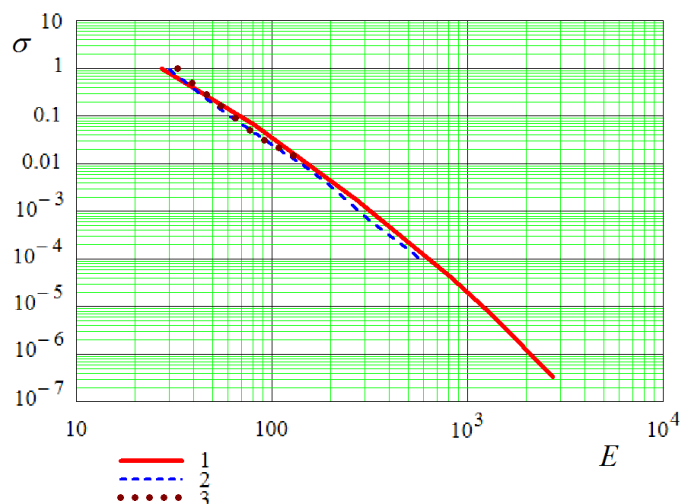


Figure 1. H_2^+ photoionization cross section σ (Mb) dependence on photon energy E (eV). Line 1 – our result, line 2 – [3], line 3 – [4]. The calculations are presented for the photon-pulse duration of $\tau \sim 1.2$ fs.

There are several works with calculations of ionization cross section for a stationary radiation with agreement of results. Our calculations are in good agreement with the data obtained by other methods. For example, in Fig. 1 our results are compared with the data of [3, 4].

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