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Inner-shell double photoionization of beryllium by intense X-ray free-electron laser pulses SAMIRA BARMAKI, MARC ANDRE ALBERT, STEPHANE LAULAN, Laboratoire de Physique Computationnelle et Photonique, Université de Moncton Campus de Shippagan — We study the inner-shell double photoionization of the beryllium Be ($1s^2$ $2s^2$) by intense X-ray free-electron laser (XFEL) pulses. The inner and the outer shell of the atom are separated by a large energy gap; the ejection of the core electrons requires photon frequencies larger than 160 eV whereas photons of 14-20 eV are sufficient to induce the double ionization of the $2s^2$ valence shell. In order to target only the core electrons, we use intense subfemtosecond laser pulses of photon frequencies above 170 eV so the ionization of the inner shell largely dominates that of the valence. Besides, the shortness of the pulses leaves no time for the relaxation of the outer shell to take place. The characteristics of the XFEL pulses allow us then to "freeze" the electrons of the valence by using a model potential, hence reducing the difficulty of the numerical investigation of the atom. In this case, the numerical study of Be becomes similar to our previous study on helium [1]. We present the results of the electron energy distribution of ejected core electrons under different laser parameters.

[1] S. Barmaki, P. Lanteigne and S. Laulan. Phys. Rev. A. 89, 063406 (2014).

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