

X-ray multiphoton ionization: direct vs. sequential processes

When an atom interacts with an intense x-ray pulse generated from x-ray free-electron laser facilities, it undergoes x-ray multiphoton ionization, which is characterized primarily by a sequence of one-photon absorption and accompanying relaxation events. It is known that the contribution of direct two-photon absorption in this scheme is negligible, because the one-photon absorption channel in the x-ray regime is typically available and its cross section is dominant. However, the direct two-photon channel contribution will vary depending on x-ray beam parameters such as photon energy and photon intensity. We offer you the chance to learn the basics of x-ray-matter interaction and to apply the lowest nonvanishing order of perturbation theory to calculate x-ray two-photon absorption cross sections. You will also have an opportunity to extend our XATOM code to include this process and then explore the role of direct two-photon absorption in x-ray multiphoton ionization, particularly when the one-photon channel is unavailable.

Group

FS-CFEL-3

Project Category

A6. Theory and computing

Special Qualifications

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