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How far electrons can spread in the material after the X-ray shot?

Modern X-ray free-electron lasers (XFELs) produce femtosecond X-ray pulses sufficiently intense to modify material properties or damage the target. On the femtosecond timescales, energetic photoelectrons and Auger electrons trigger secondary electron cascades, which can spread the damage beyond the laser spot. We simulate these cascades using an in-house classical Monte Carlo code XCASCADE-3D [1-3], which can provide temporal and spatial characteristics of the excited electrons, including their energy distribution.

In this work, the student would perform XCASCADE-3D simulations to investigate spatial and temporal electron distribution in irradiated targets under various irradiation conditions. The results should help to interpret recent experimental data and to guide further experimental efforts.

Field

A6: Theory and computing

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