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Title (English)

On the feasibility of nuclear fusion experiments with XUV and X-ray free-electron lasers

Title (Swedish)

Abstract

We have performed simulations to investigate the feasibility of deuterium-deuterium nuclear fusion experiments with novel X-ray and extreme ultraviolet free-electron lasers. Two cases were considered: First, using the existing FLASH facility at DESY (Hamburg) to irradiate a bulk target such as deuterated plastic or a metal deuteride. This scenario is studied using the plasma physics software Cretin. Secondly, the case of using molecular clusters as a target for the hard X-ray FEL is investigated with molecular dynamics simulations. Our results indicate that a solid target irradiated by the FLASH would not be heated enough, whereas molecular clusters irradiated by a hard X-ray FEL would produce the neccessary keV deuterons.

Keywords

free-electron lasers, plasma physics, molecular dynamics, nuclear fusion

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