

Intense Ion Beams for Fusion Research

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Markus Roth

Los Alamos National Laboratory, Technische Universität Darmstadt

Ion beams at highest intensities can be provided using either accelerator facilities of high energy short pulse lasers. The synergy of using these two different techniques can lead to a better understanding of the physics of intense beams, the interaction with matter and the production of useful secondary radiation to explore fusion relevant phenomena.

The interplay of self generated electric fields with their magnetic counterpart can be studied using small scale laser experiments that lead to first results on new fusion concepts like the X-targets.

Moreover short, pulsed, intense ion beams also can serve as a source for secondary radiation that might explore especially the realm of Warm Dense Matter (WDM), a crucial transient state in all fusion experiments. We have explored the use of intense, laser driven ion beams as a compact neutron source for fast neutron radiography in a collaborative effort between LANL, SNL and the TU Darmstadt. First results on recent experiments will be presented as well as a first target design and experiment for a first X-target study.

Primary author: ROTH, Markus (TUD / LANL)

Presenter: ROTH, Markus (TUD / LANL)

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