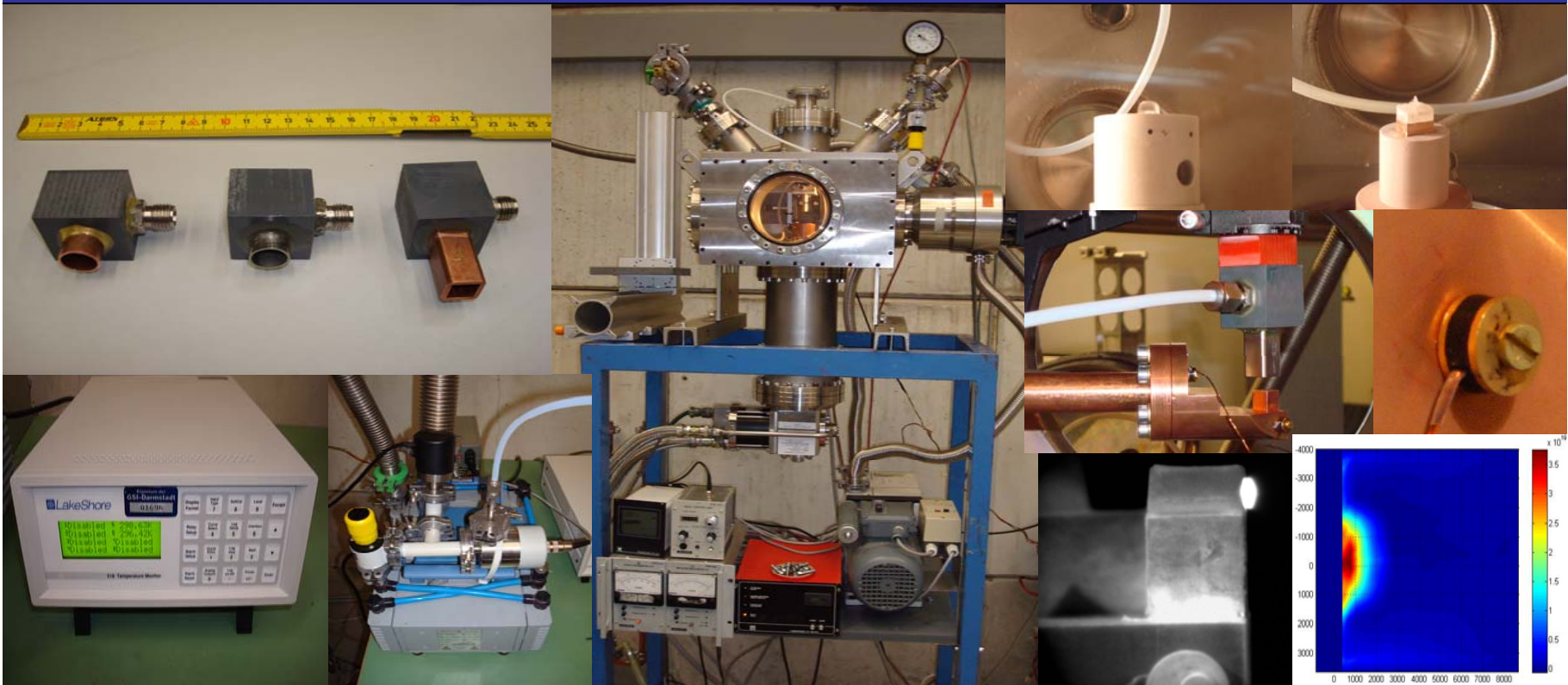


Cryogenic Targets for Ion Energy Loss Measurements in Laser Plasmas

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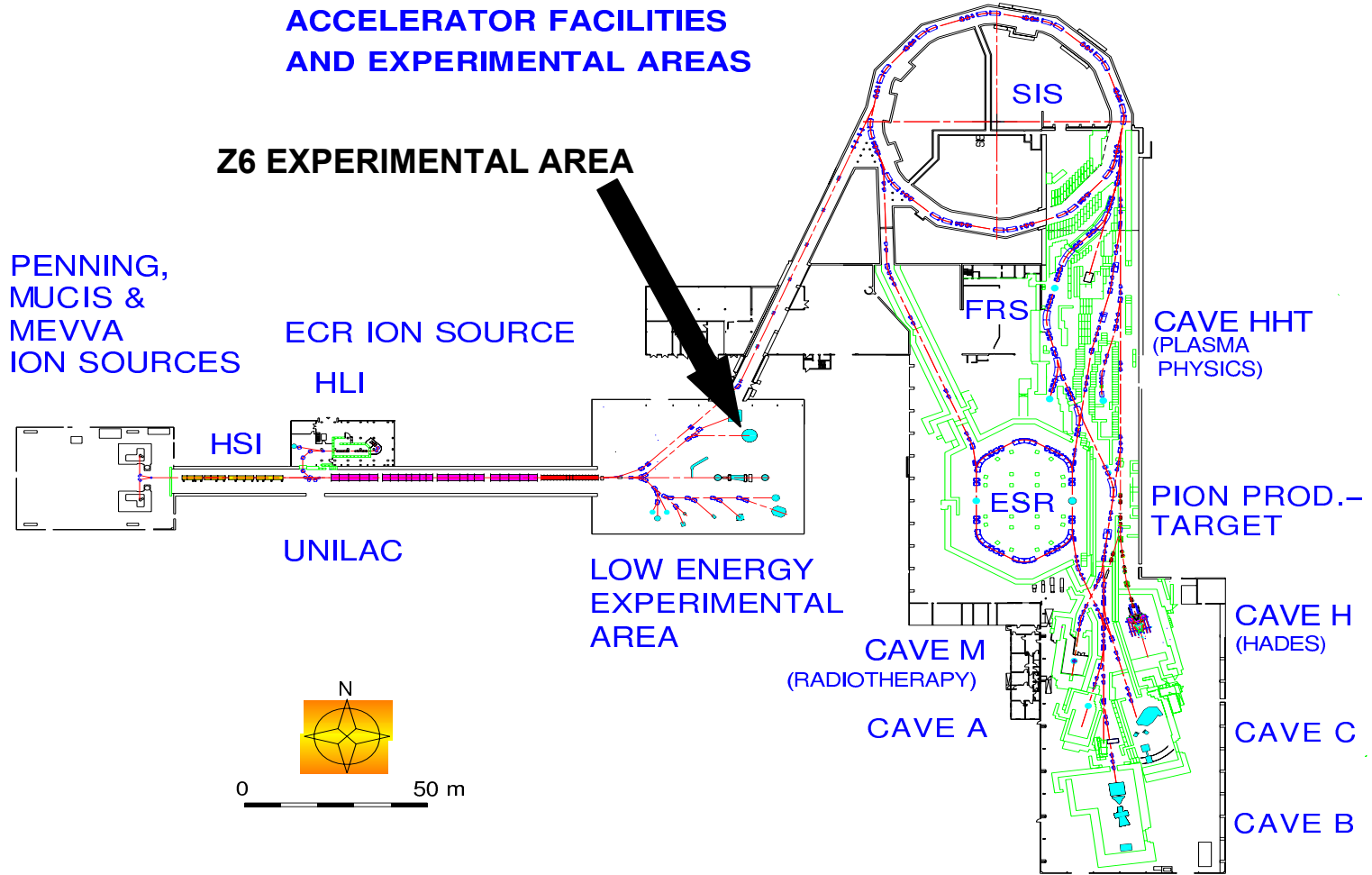
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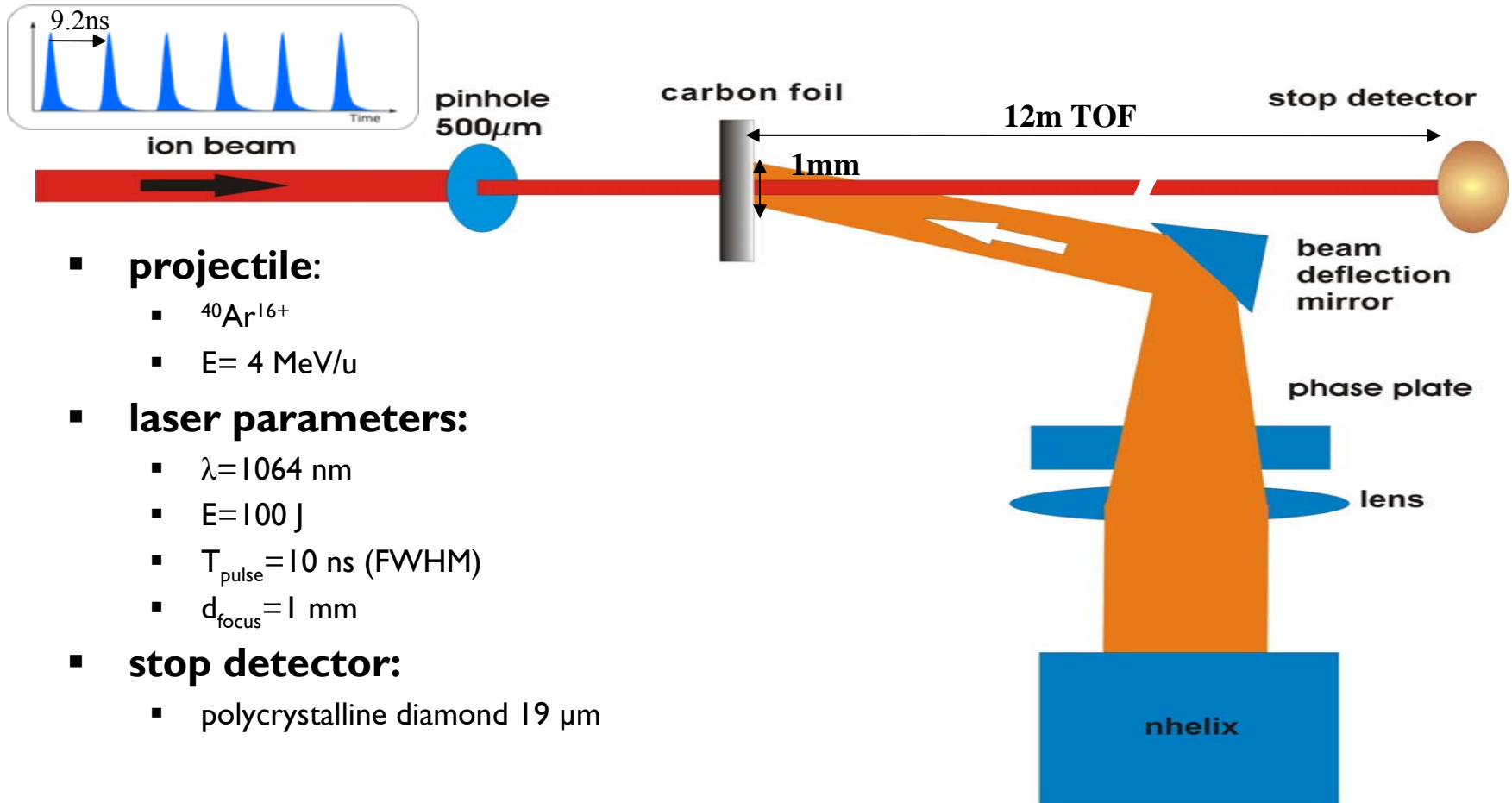


GSI Helmholtzzentrum für Schwerionenforschung





Experimental Setup of Ion Energy Loss Measurements in Laser Plasmas



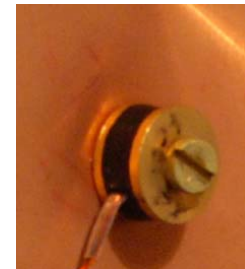
Cryo test setup



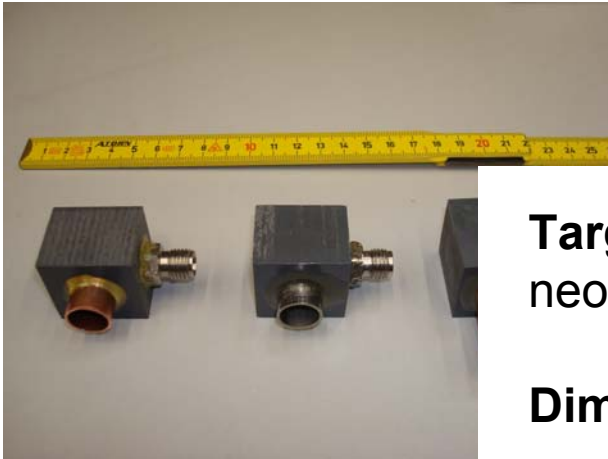
4K cryo system
cooling capacity: 1.5Watts @ 4.2K
cooldown time: 60min



Cernox temperatur sensors
calibrated accuracy: 5 mK @ 4.2K
temperature range: 1.5-300K
dimensions: 8x4.5mm



Cryo target production



Target materials: nitrogen, argon, neon, krypton, hydrogen, deuterium

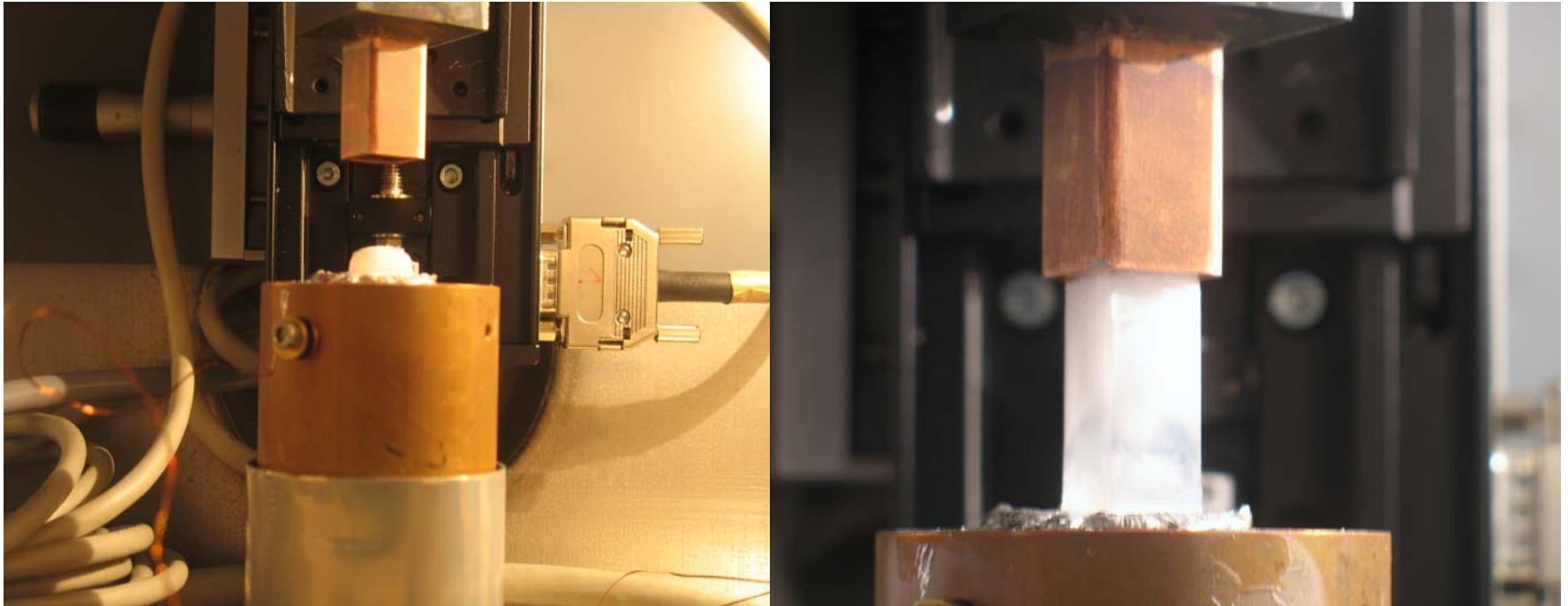
Dimensions: mm, cm

Growing time: 10-40min

Lifetime: 30min and longer

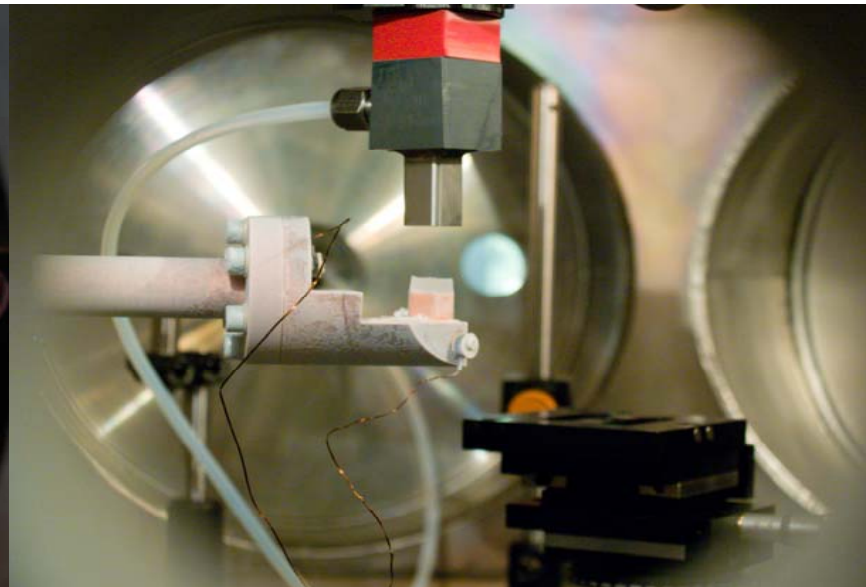
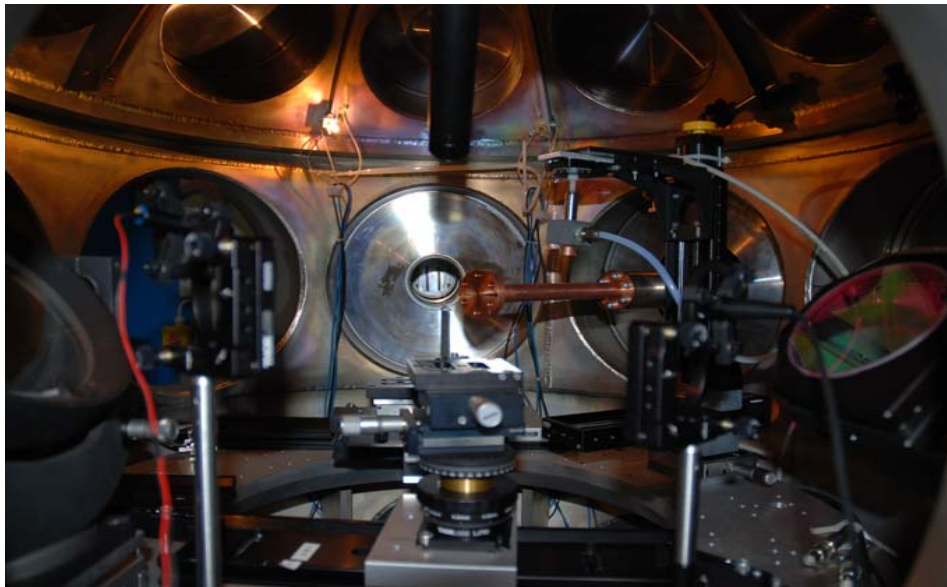


Gas precool system



The quality of cryo crystals can be improved by using precooled gas. This decreases growing time; tall crystals of height 4 cm are possible.

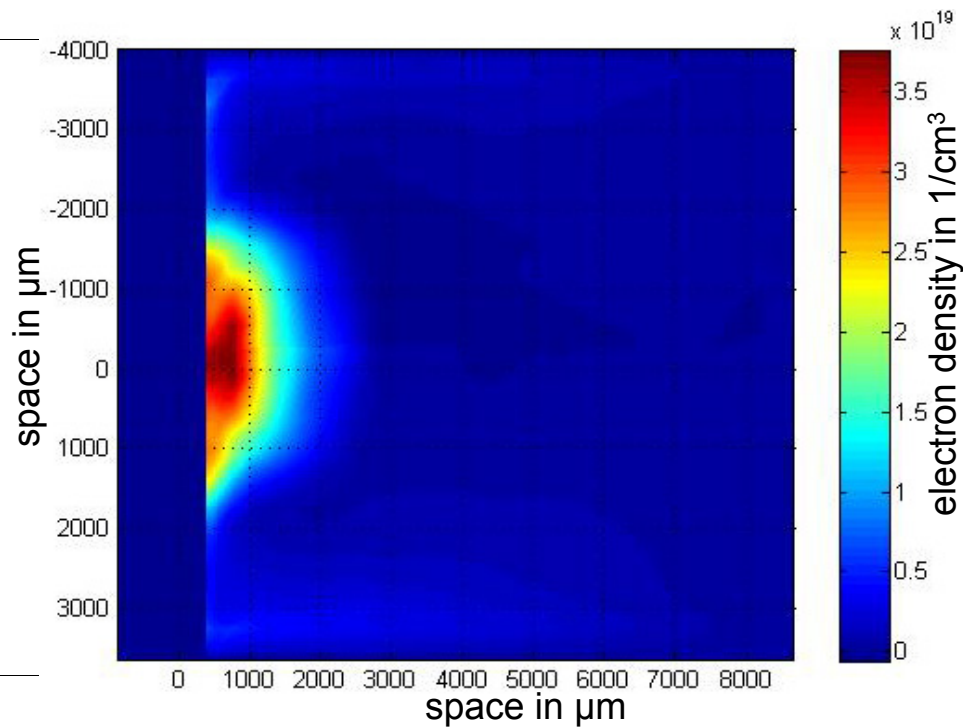
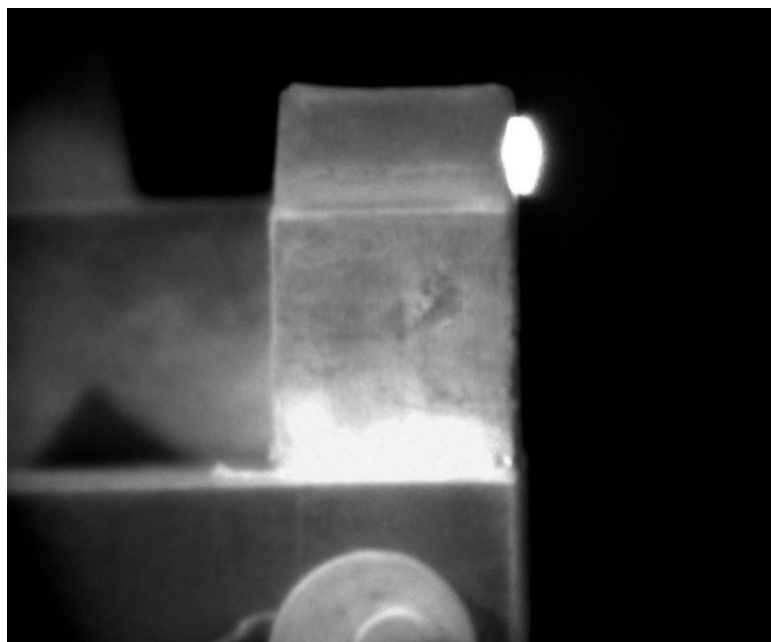
Laser plasma produced out of a solid nitrogen target



additional components:

- Adjustable mounting of cryo cooler
- Remote control of the growing chamber
- Copper extension of cryo cooler
- Target support for the cryo target

Laser plasma produced out of a solid nitrogen target



solid nitrogen target:

- dimensions: 10x10x4mm
- growing time: 20min
- growing pressure: 300mbar
- temperature: 10K

diagnostics:

- streak camera
- fast shutter camera
- X-ray pinhole camera
- Wollaston interferometer ($\lambda=355\text{nm}$)

Summary

- Cryogenic system has been set up and tested.
- Targets of different gases (argon, neon, nitrogen) have been produced.
- Cryogenic target system has been implemented at the Z6 experimental area.
- First experiment with cryogenic nitrogen has been successfully performed.

- Hydrogen targets will be produced in the near future.

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Thank you for your attention