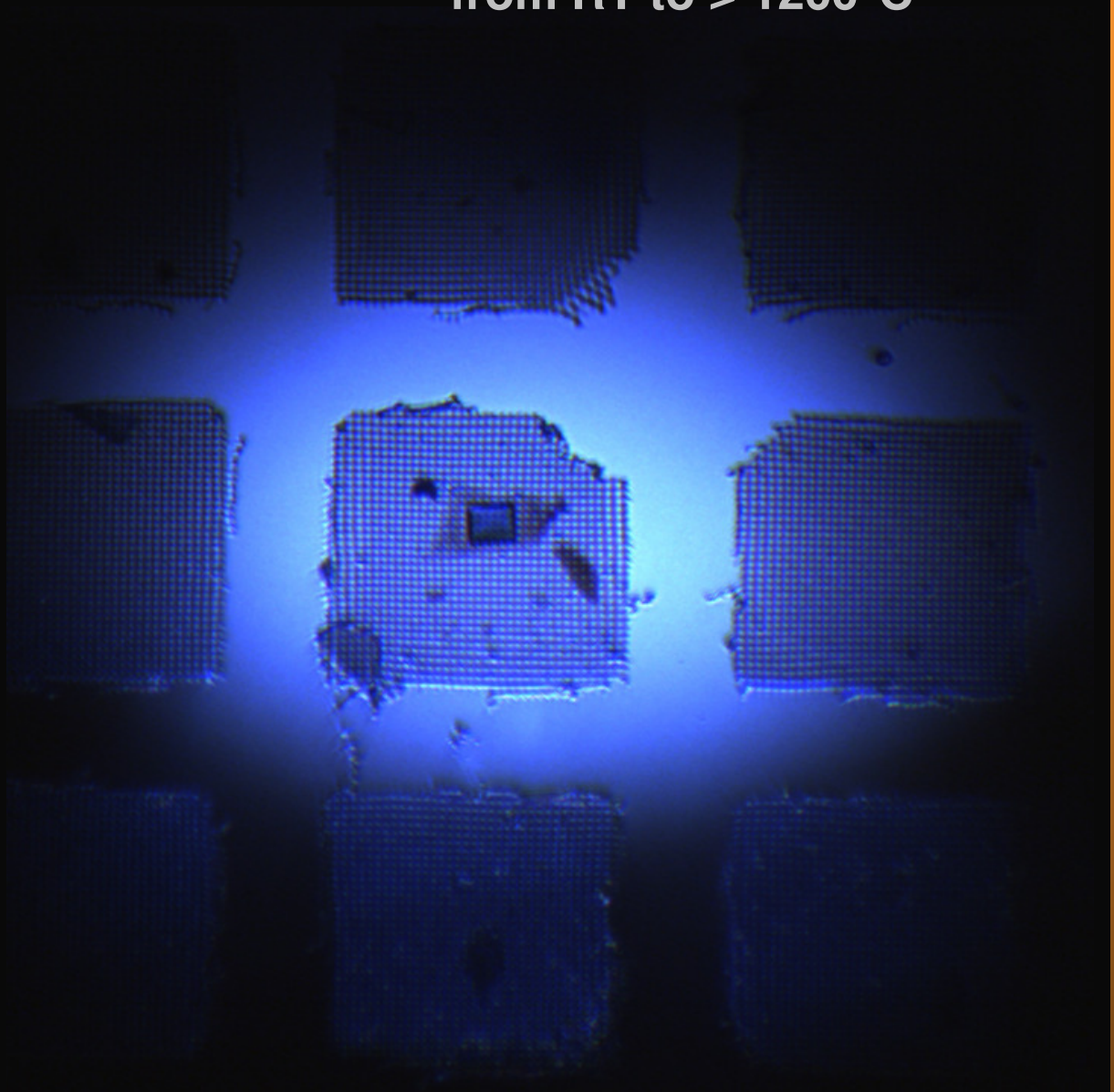
Spot heating in the SEM

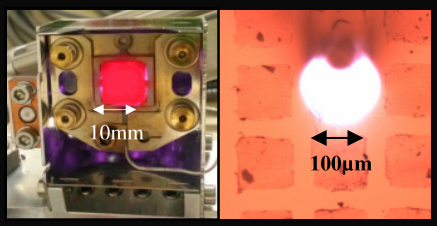
- from 10 mm to 100 µm
- from RT to > 1200 °C



SEM - Laser Heater

Diode Laser - the ideal microscopy and SEM Heater

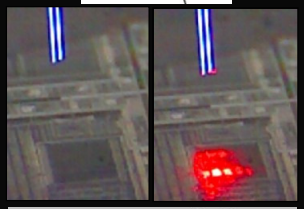
- minimized heat generation under a microscope or in the SEM for a given temperature
- heat generation only at the heating spot
- large variation of the heating spot size
- very high control dynamic, independent of the temperature



For every spot size – a perfect solution

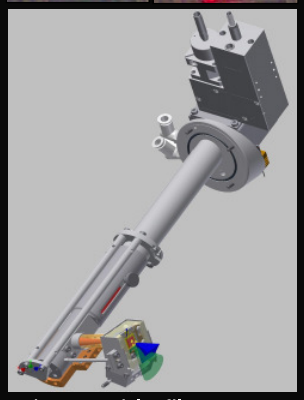
Moving fiber – the best solution for small spots

Small spots need only low power diodes. The most flexible solution is the moving fiber. This application is using the numerical apperture of the fiber to vary the spot size of the laser radiation at the substrate. The spot can be changed from the fiber diameter up to 2mm or above, the used laser power is defined by the temperature and the substrate conditions. The focussing can be done in a manual set-up or in-situ by using an internal manipulator like the KLEINDIEK micromanipulator.



Optical beam line – for higher temperatures

If substrates need to be completely heated or have to reach higher temperatures - more power is necessary. For such application an optical beam line is recommended to heat the substrate. A variable optic with lenses and a mirror is placed in the SEM chamber and a mechanically coupled pretilted sample holder allows to move the internal stage to measure at any spot of the full 10x10mm surface area. All detectors have access to the substrate surface.

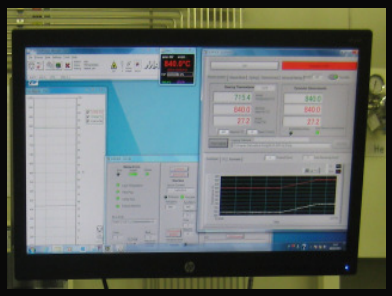


Thermal electron filter

At higher temperatures the amount of thermal electrons, emitted from the surface, will reduce the contrast of the immage. To lower this effect, the sample holder includes a exchangeable filter system which is DC biased to enhance the contrast at high temperatures.

Powerful software

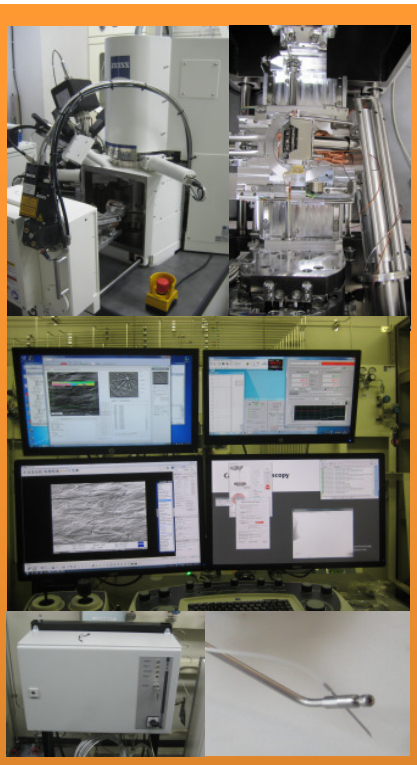
The laser heating system is controlled via a high Performance software based on the 10kHz based pyrometer data aquisition.
The software allows temperature ramps from 500 °C/sec down to $1x10^{-2}$ °C/sec.



For most SEM's available

Supporting different SEM systems

Both available SEM laser heater versions are available for most scanning electron microscopes. Necessary is always one free flange at the front door of the extricable



Specifications:

Spot size: 50µm up to 2mm

Low power, moving fiber

Max. Temp:	depending on substrate
Laser:	Diode, CW
Wavelength:	808 nm, 940 nm
Output power:	4 W – 15 W
Light fiber:	100µm, 5m long
SEM interface:	depending on SEM dual fiber feedthrough flange with metal flex conduit to the controlle
Optional:	
Pyrometer :	single or dual wl 100µm fiber input
Controller:	table top case
PC control:	USP interface with WIN7 driver graphical user interfac datalogging

Spot size: 2mm up to 10mm

High power, optical beam line

Laser:	CW and PM up to 2 kH
Wave length:	**940 nm**
Output power:	45 W - 140 W
SEM interface:	depending on SEM Laser head with integrated pyrometer, two light fiber in metal conduit to the controlle
Light fiber:	400µm, 7m long
Pyrometer :	single or dual wl range 1,2....1,8 µm up to 10kHz sample ra
Controller:	real time LINUX syster TCP/IP interface, WIN7 driver,