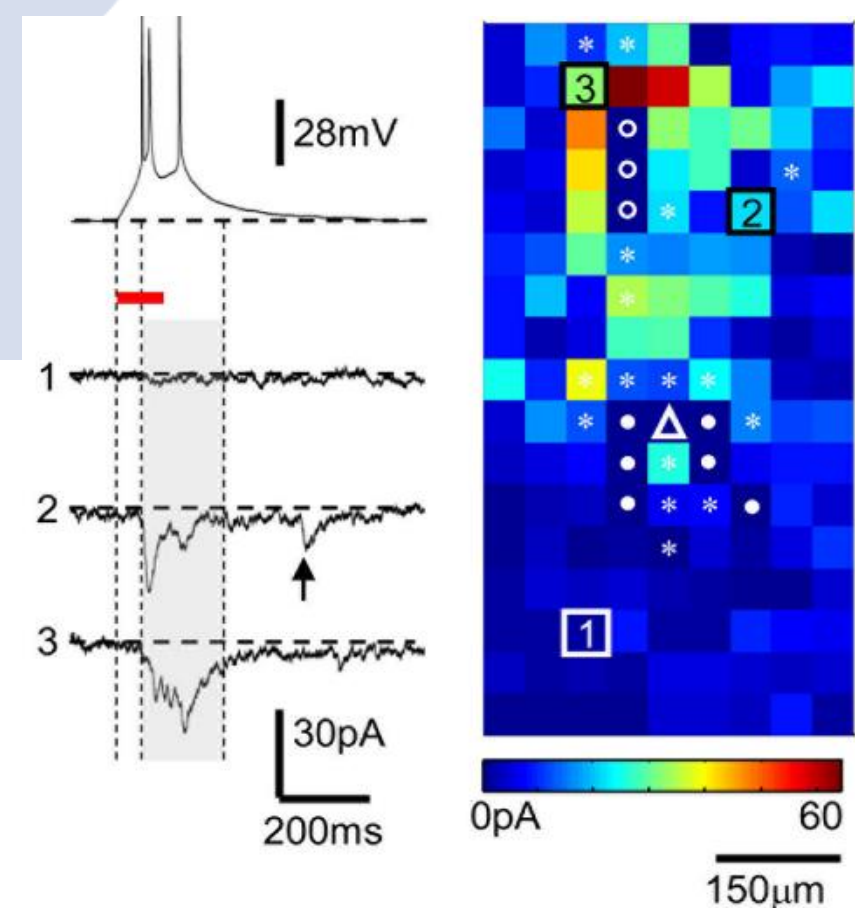
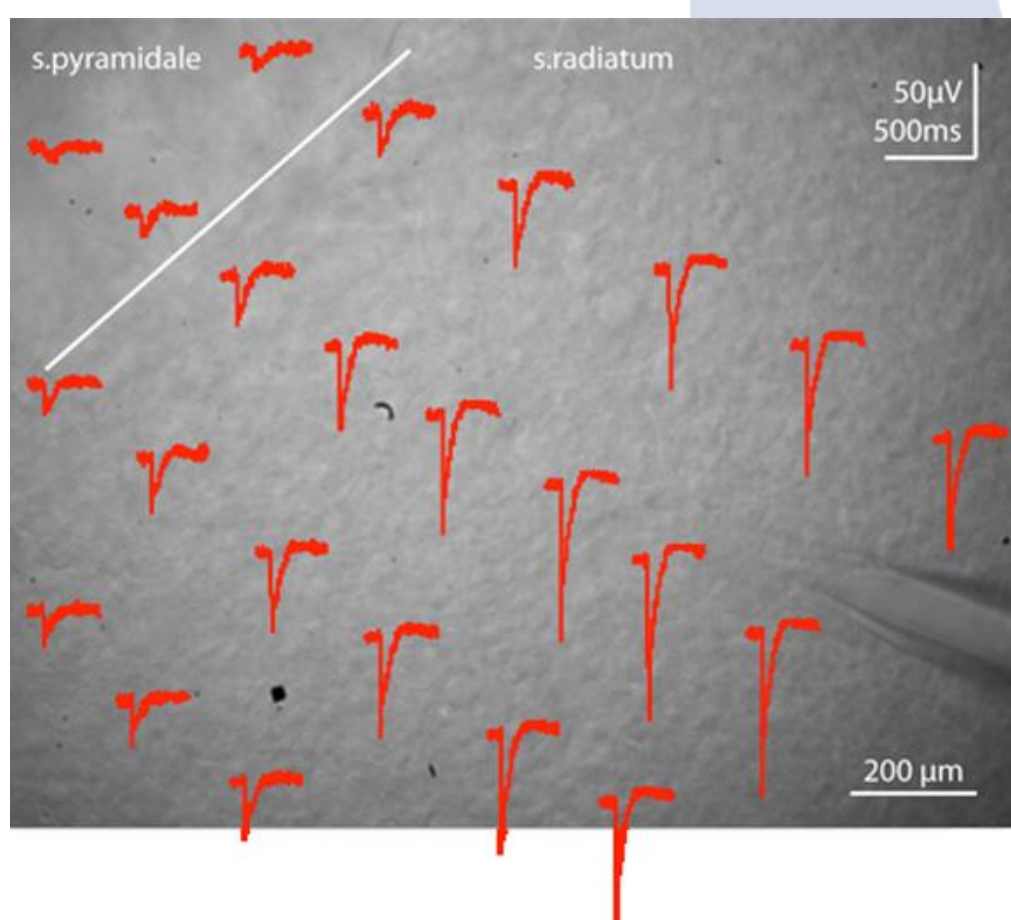
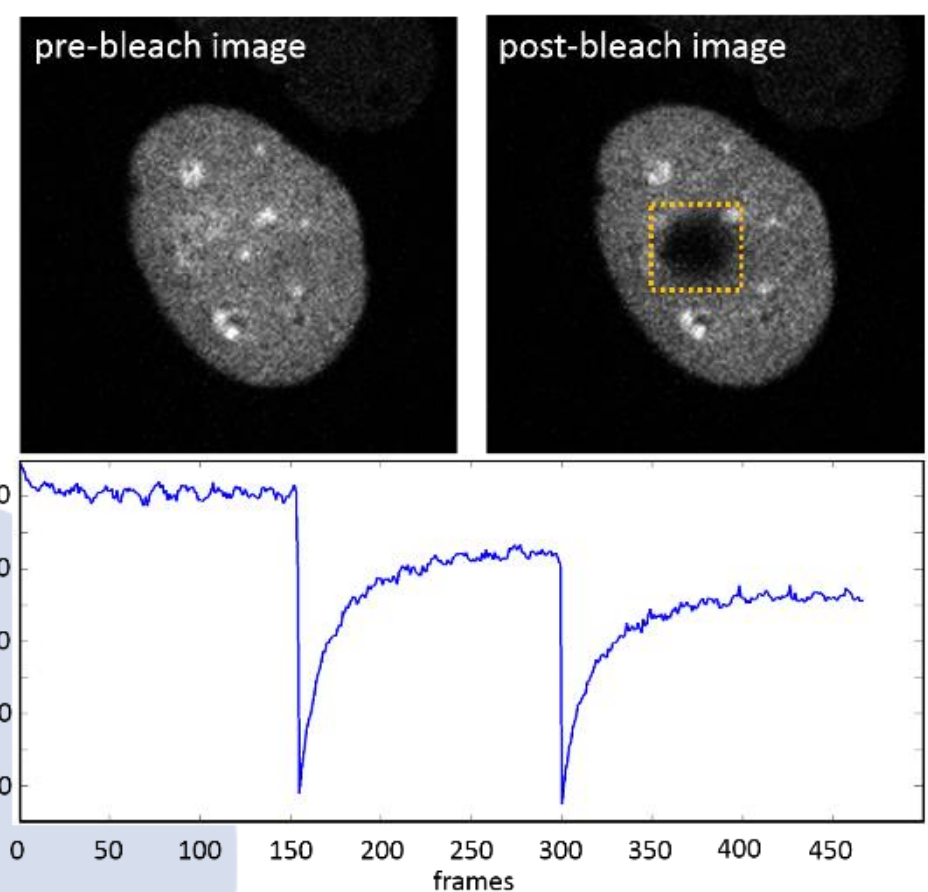
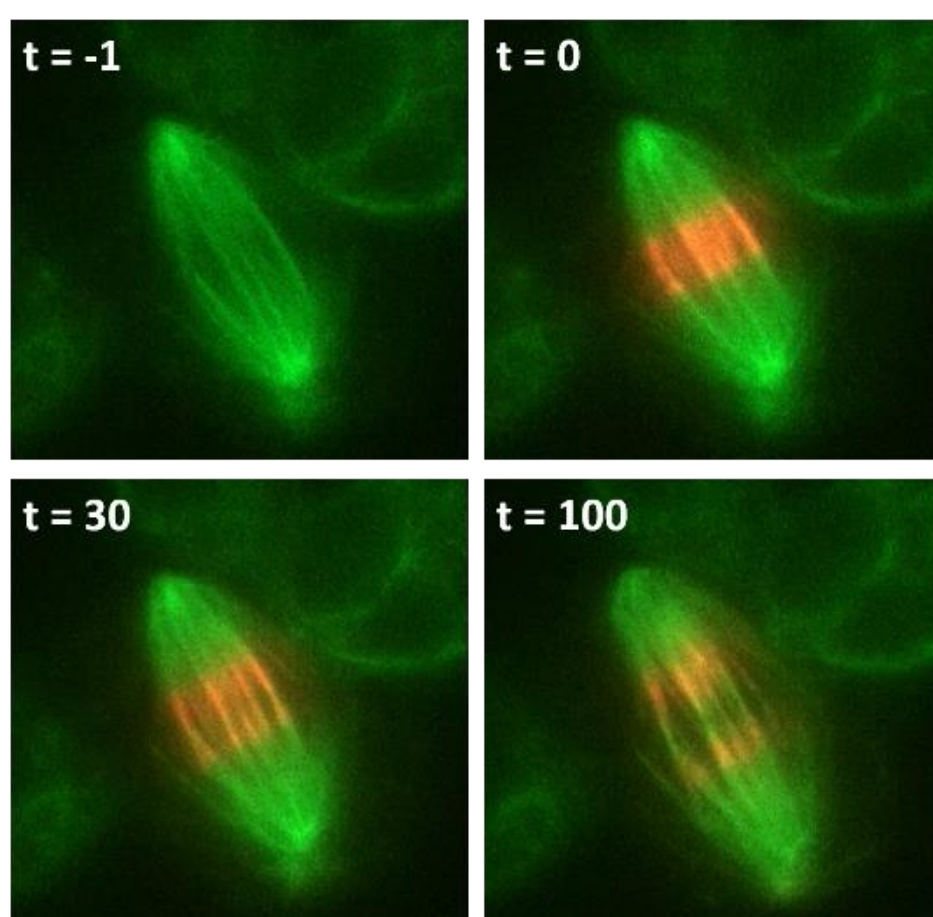


UGA-42 Series: For Localized Illumination



- Optogenetics
- Uncaging
- Neuronal Mapping
- Photobleaching

- Photoswitching
- Ablation
- Microdissection
- DNA-Damage

The UGA-42 *Firefly*

The UGA-42 *Firefly* is a point scanning device for photomanipulation, suitable, in particular, for applications which require high power density and/or small spots. It can be equipped with one or more laser sources coupled via optical fibers or directly, via optics, depending on the type and power of the laser. The spot size depends on the configuration of the system (e.g. microscope model, objective magnification & NA, type of laser connection). Spots close to the diffraction limit can be achieved using single mode fibers or directly coupled lasers. Up to four lasers can be used independently within the same experiment.



Applications

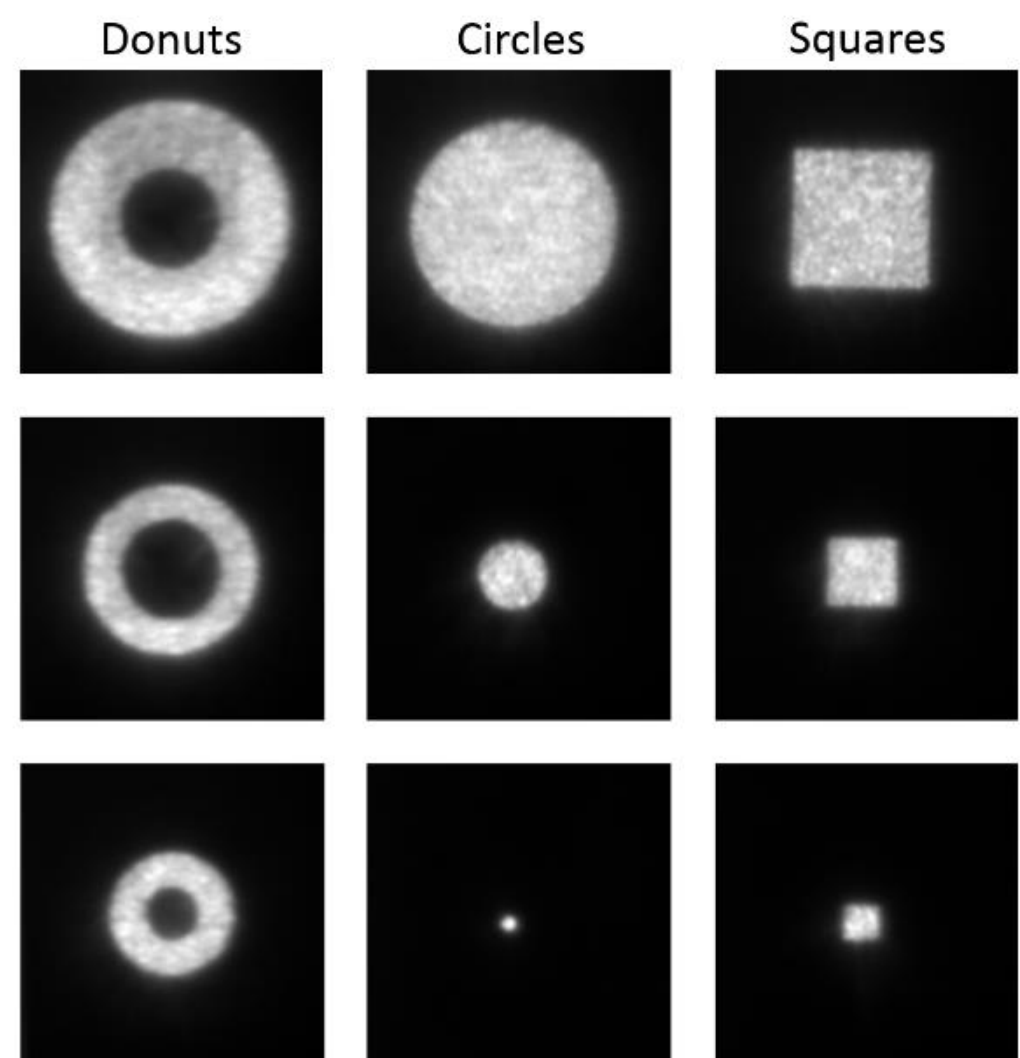
- Photolysis / uncaging of neurotransmitters, nucleotides, Ca^{2+} etc.
- Optogenetic photostimulation /- inhibition of cellular processes
- Neuronal mapping
- Photobleaching / FRAP
- Photoswitching / photoactivation of fluorescent dyes

UGA-42 Geo

Scanning ROIs with a small spot is associated with a temporal delay of illumination within the corresponding region. For fast processes, like neuronal signaling or free diffusion, scanning can lead to undesired artefacts and loss of signal. To overcome this limitation, in applications where simultaneous illumination throughout an area is crucial, Rapp OptoElectronic has developed the UGA-42 Geo, a unique scanning device in which the laser beam is reshaped to produce spots of different sizes and shapes which are illuminated without scanning.



Spot shape/size examples:



Applications

- Photoswitching / photoactivation of fluorescent dyes
- Optogenetic photostimulation /- inhibition of cellular processes
- Neuronal mapping
- Localized temperature-jump
- Photobleaching / FRAP

UGA-42 *Caliburn*

The UGA-42 *Caliburn* is designed to produce localized, controlled damage in biological samples. Similar to the UGA-42 *Firefly*, the UGA-42 *Caliburn* produces small laser spots in the microscope field of view, but, instead of fiber optically coupled CW lasers, it is equipped with directly coupled pulsed lasers. Different nanosecond pulse lasers at **355 nm** and **266 nm** are available, depending on experimental need.

The UGA-42 *Caliburn* features motorized laser focus and laser power attenuator.

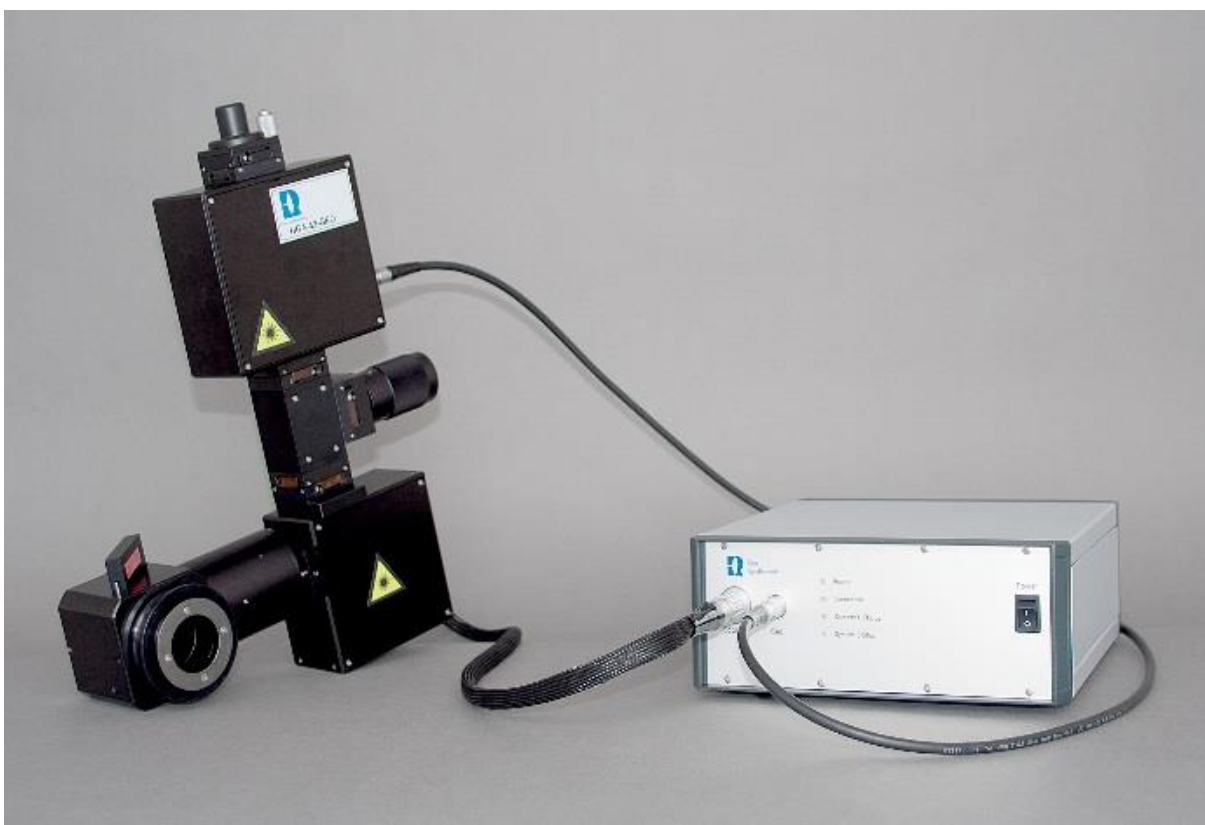


Applications

- Ablation & Microdissection @355 nm
- DNA damage @355 nm
- Specific DNA damage @266 nm

Customized Systems

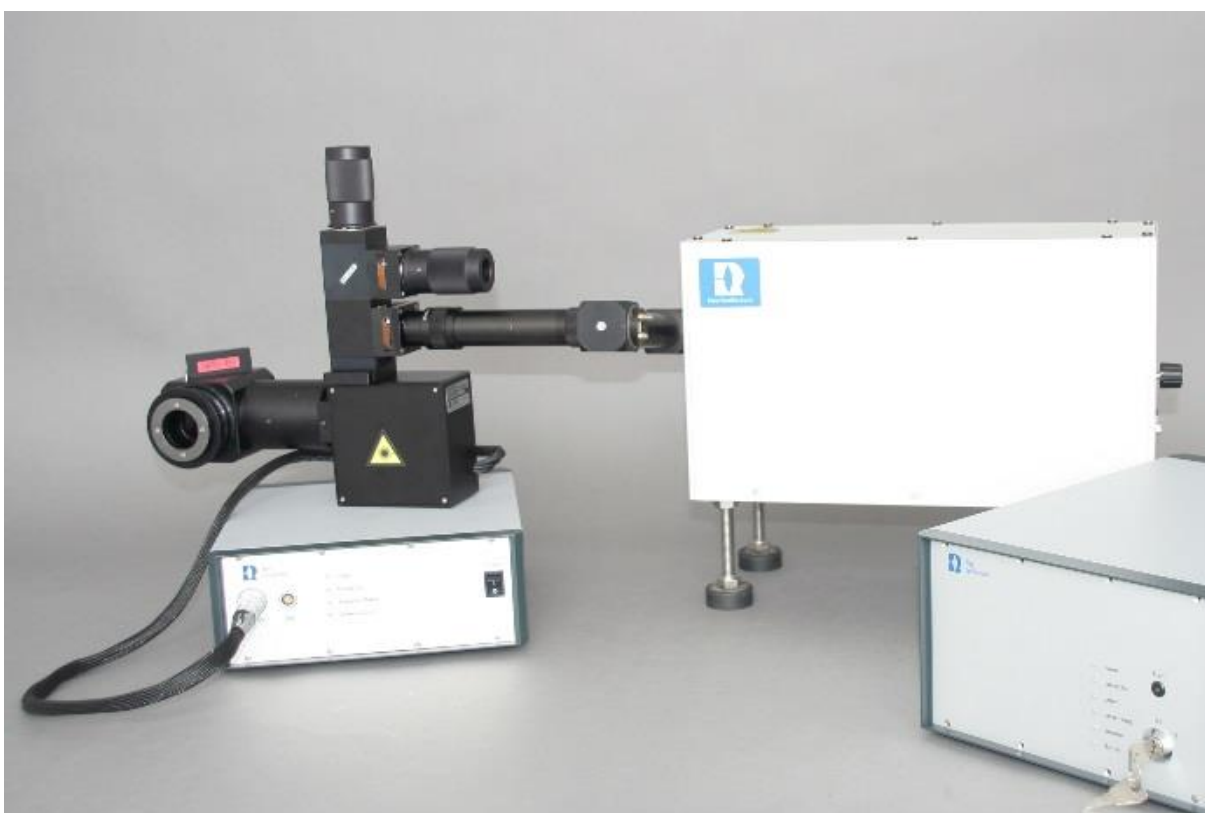
Taking advantage of the modularity of the UGA-42 series, customized systems can be built based on any two or on all three basic UGA-42 devices. These combination systems embody the features and advantages of the UGA-42 components providing a versatile, multipurpose photomanipulation platform on a single microscope rig.



UGA-42 *Geo* & *Firefly*

Application example:

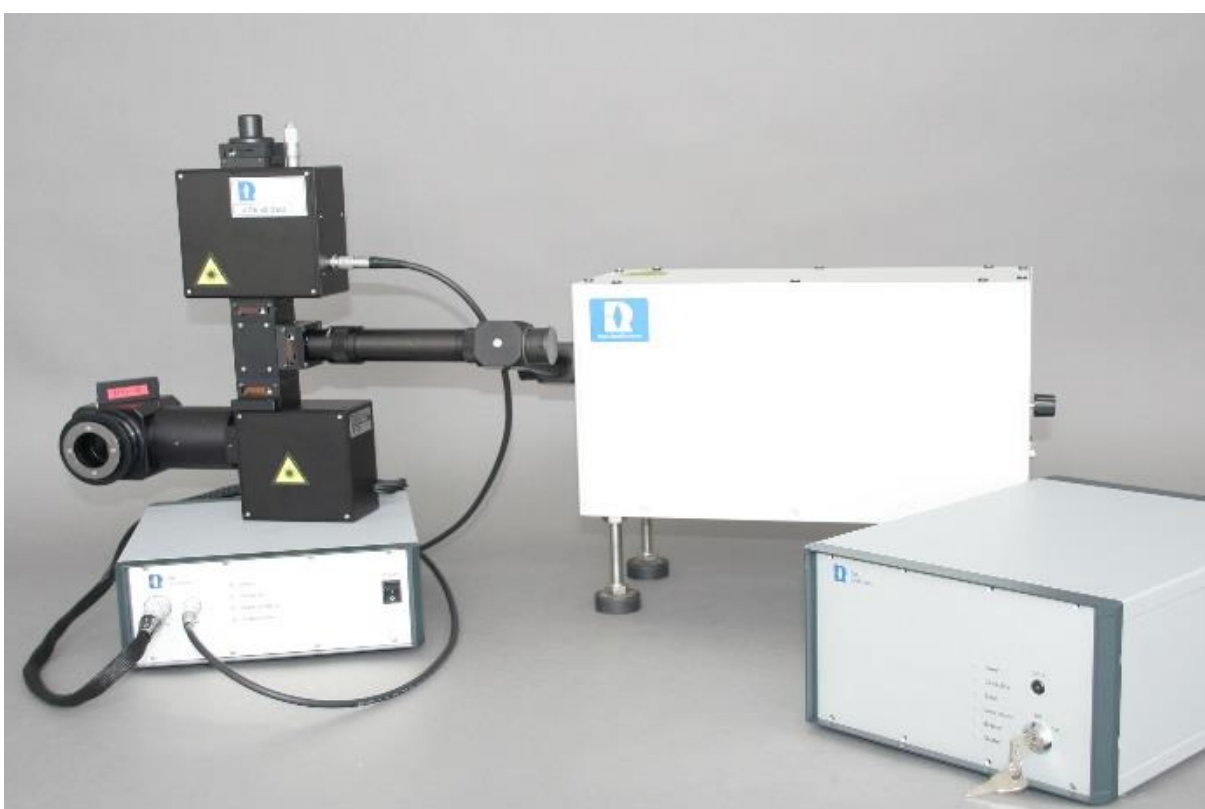
- **Optogenetics** via the *Geo*
- **Uncaging** via the *Firefly*



UGA-42 *Caliburn* & 2-laser *Firefly*

Application example:

- **Ablation** via the *Caliburn*
- **FRAP** via the *Firefly*
- **Photoswitching** via the *Firefly*



UGA-42 *Caliburn* & *Geo*

Application example:

- **Ablation** via the *Caliburn*
- **Optogenetics** via the *Geo*

Hardware Features:

- The UGA-42 devices are coupled via dichroic mirrors to the microscope, enabling:
 - parallel coupling of a fluorescence light source for imaging
 - simultaneous photomanipulation & image acquisition
(no mirrors need to be moved/flipped during the experiment)
 - combination with most other imaging techniques without interference
(e.g. epi-fluorescence, spinning disk, LSM etc)
- **Near diffraction-limited spot sizes** possible with the **UGA-42 Firefly** and **UGA-42 Caliburn**; actual spot size on the sample depends on the optical system
- **Different spot shapes and sizes** available with the **UGA-42 Geo**; actual spot size on the sample depends on the optical system and magnification
- **Digital and analog laser modulation**
- **2 TTL output & 2 TTL input channels** for synchronization with other devices
- **Up to 4 lasers** can be used **within** the same **experiment**
- **Broad range of laser wavelengths** (UV/VIS/IR; 266 – 1470 nm):

Spectrum of Applications

