Laser applications for sustainable plant protection

LASER ZENTRUM HANNOVER e.V.

EPIC Online Technology Meeting on Agri-Photonics, PD Dr. Merve Wollweber

Food & Farming at LZH: Laser technology for…

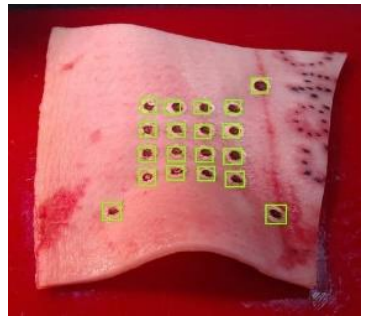
… plant protection

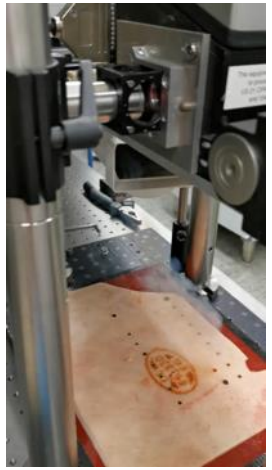
Weed control

Control of herbivorous insects

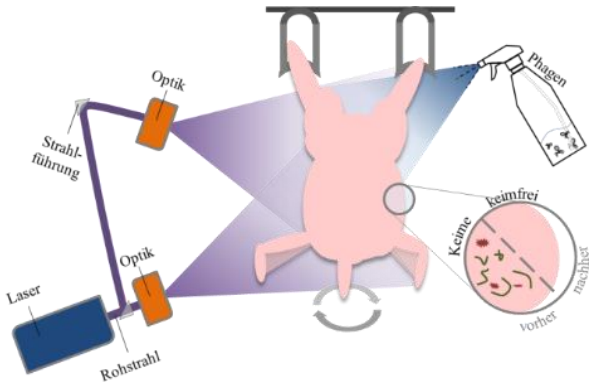
… food production

Marking





Reduction of microbial load



Images: *pig carcasses in slaughterhouse* from pixabay
poultry in slaughterhouse by USDA via flickr

Laser weeding

Laser treatment of plants

- *Amaranthus retroflexus*
- 100 W thulium-fiber laser
- 5 mm beam diameter
- 200 ms exposure

Video: LZH

Laser weeding

Before treatment

After treatment

Three weeks after treatment

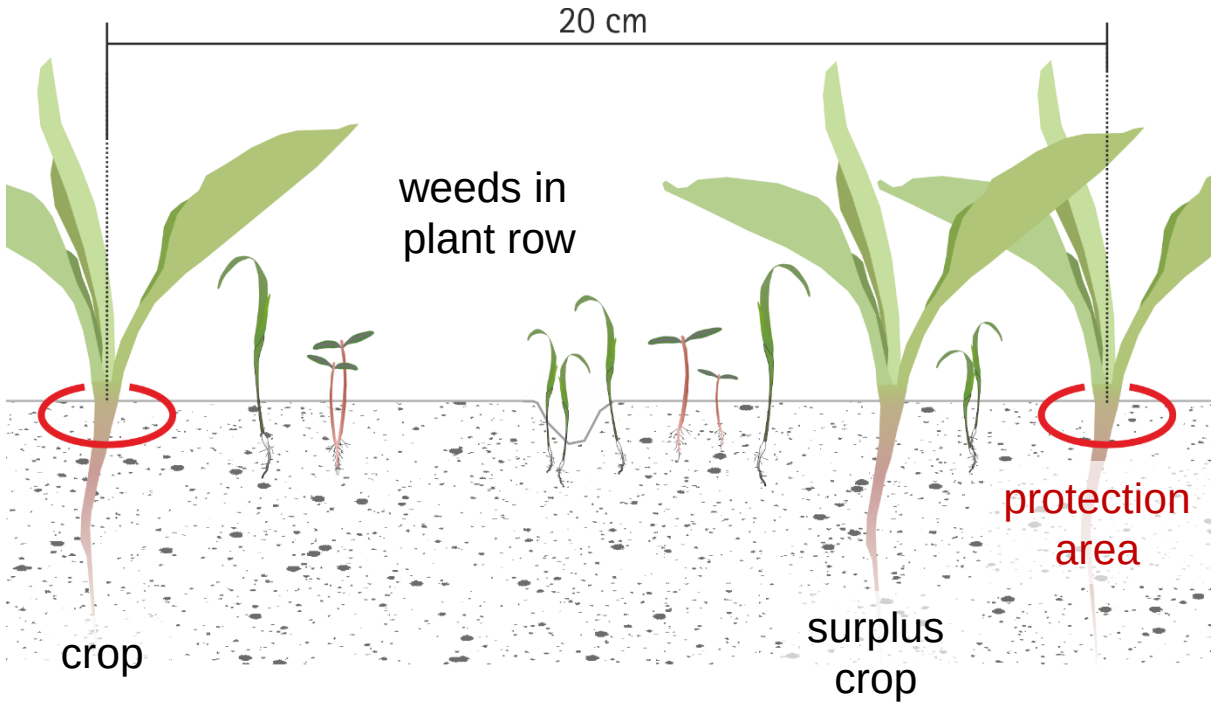
Picture: LZH

Laser weeding: Innovative plant protection

Characteristics

- Precise single plant treatment
- AI target classification and localization
- Mechanism: thermal effect
- Efficient for young plants up to BBCH14
- Compatible to conservation soil cultivation
- Low-wear technology

- Precision + selectivity → enabling technology for weed management allowing for maximal biodiversity



Graphics: C.Marx LZH

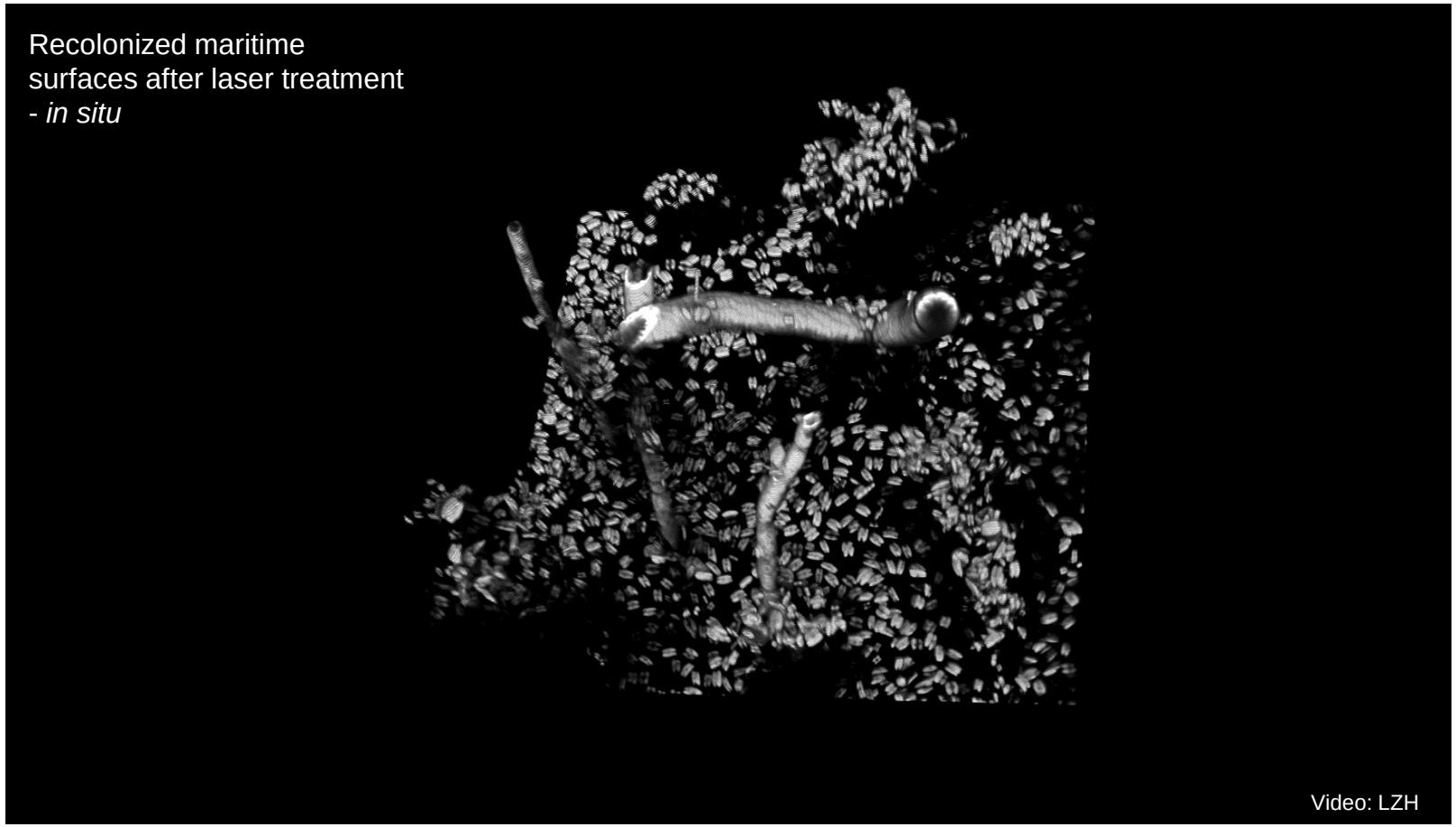
Pest management

Laser treatment of herbivorous insects

A mobile LED-Laser-Device to startle, lure, map and selectively treat herbivorous insects in the greenhouse

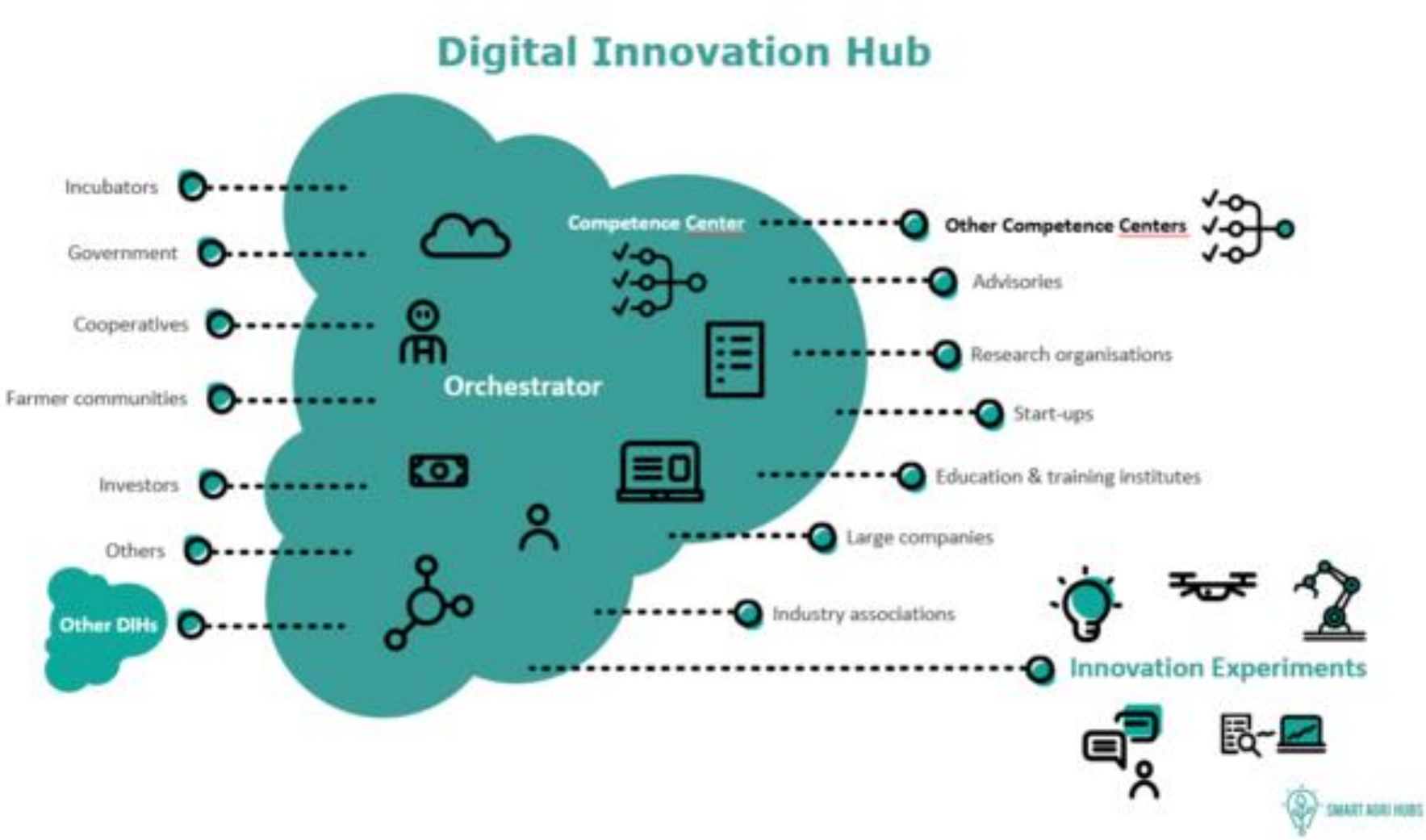
Services and Networking

LZH imaging technologies



- Multi-Photon Microscopy (MPM)
- Opical Coherence Tomography (OCT)
- Lightsheet Microscopy
- Scanning Laser Optical Tomography (SLOT)
- Electron Microscopy
- High Speed Imaging

LZH – a Digital Innovation Hub



Graphics: SmartAgriHubs

EPIC summary

What can you do for us?

- robust systems for agriphotonics: laser chillers, laser scanners, commercial lasers, cameras (2D, 3D, RGB, multispectral, hyperspectral, …), optical/laser sensors

What can we do for you?

- Application know-how for new markets (bridging photonics and agrifood)
- R&D infrastructure: test benches, cell lab, green house, outdoor testing, etc.;
- Networking in the German agri-photonics community

Thank you for your attention.

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