

Polymer Welding with VCSEL Laser Systems

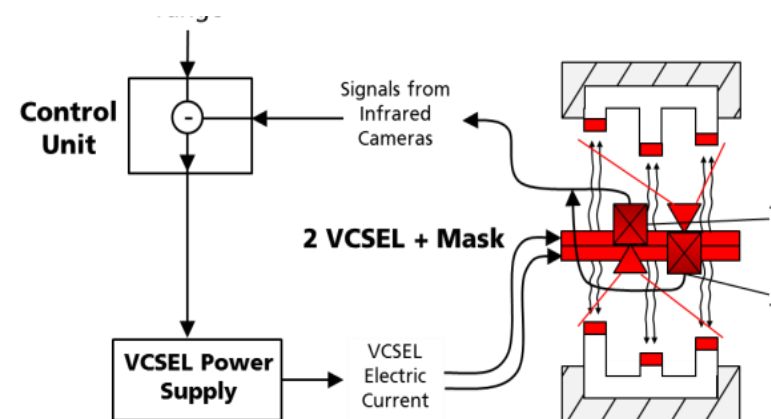
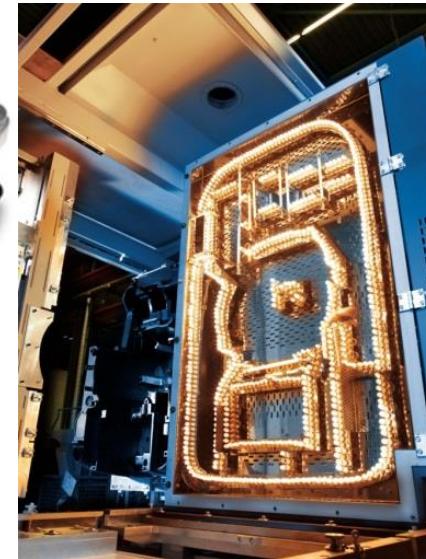
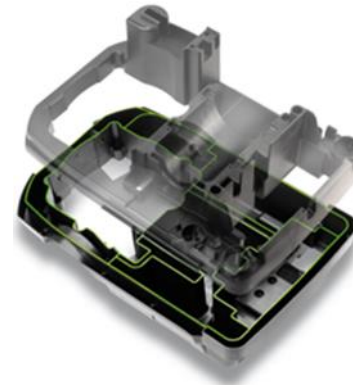
H.Moench

Philips Photonics

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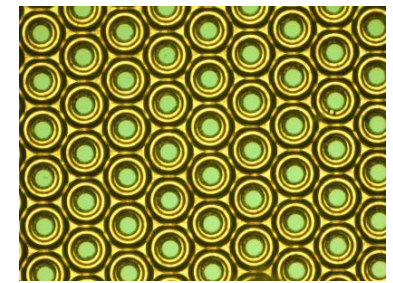
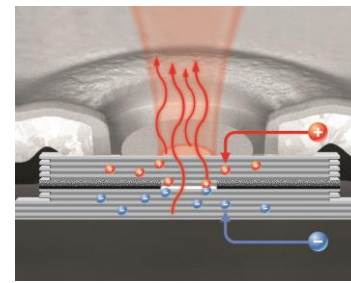
Infrared welding with direct laser emitters

- Demand for clean (particle free) welding of thermoplastics requires contactless heating
- Existing contactless technologies (IR short wave, IR medium wave, hot gas) have several disadvantages
- Today no inline process control (e.g. by pyrometer or IR-Camera) possible (too close heating distance, too high tool temperatures)
- We want to develop a toolbox of standardized laser emitters for reconfigurable, energy saving, focused heating of plastics for welding with the advantages:
 - Energy on demand
 - Fast energy response (min. thermal damage)
 - Focused beams → selective heating
 - integration of sensors for **inline process control**
 - Selective adjustment for optimized heating

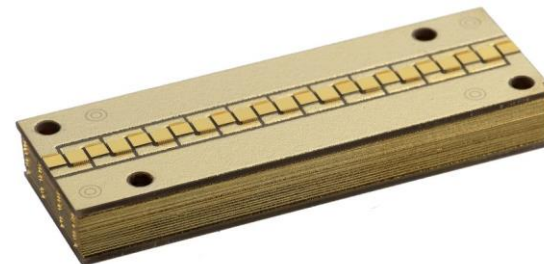
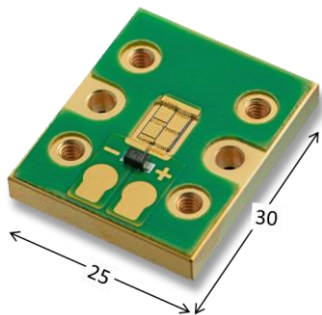
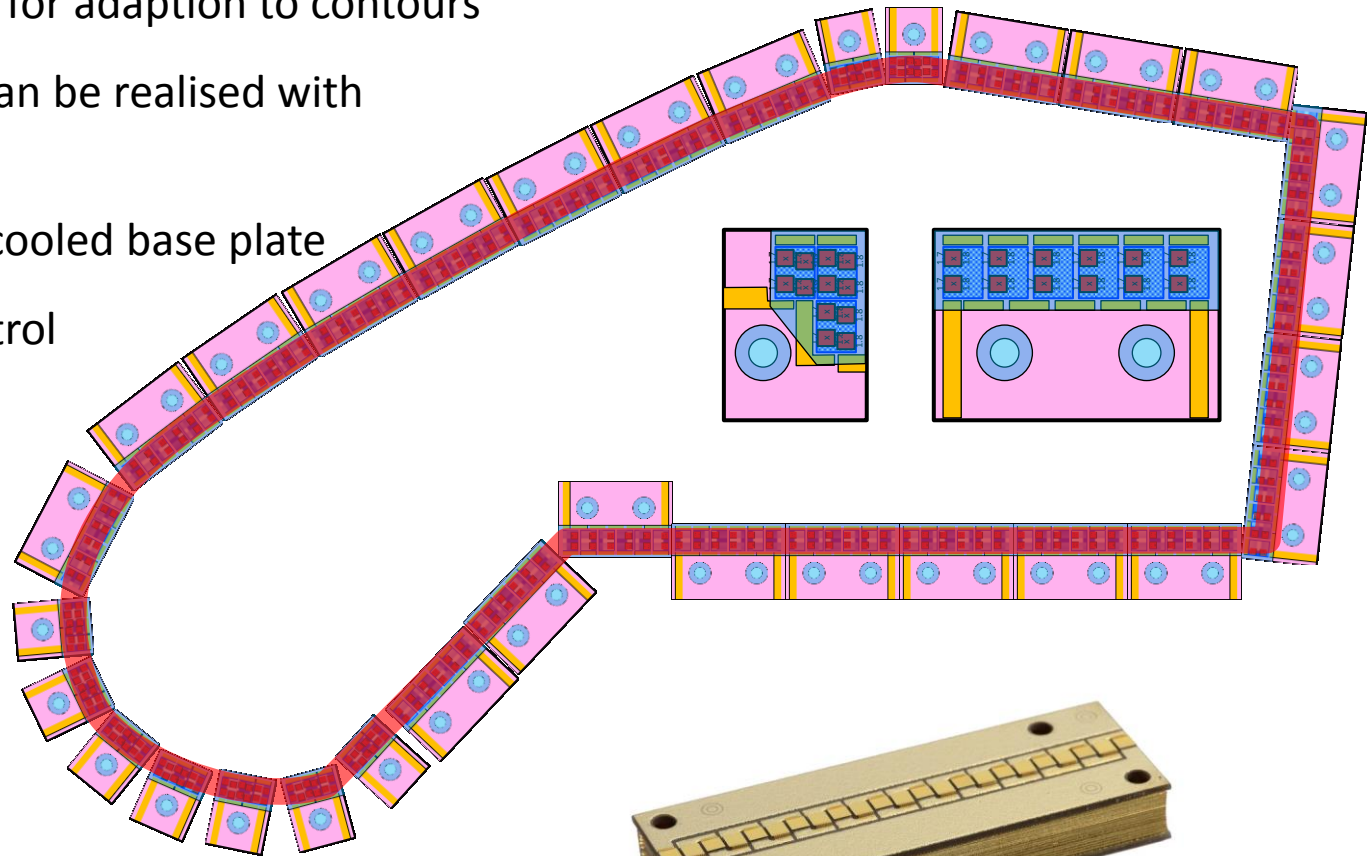


“VBlox” VCSEL blocks

Welding Tool Example



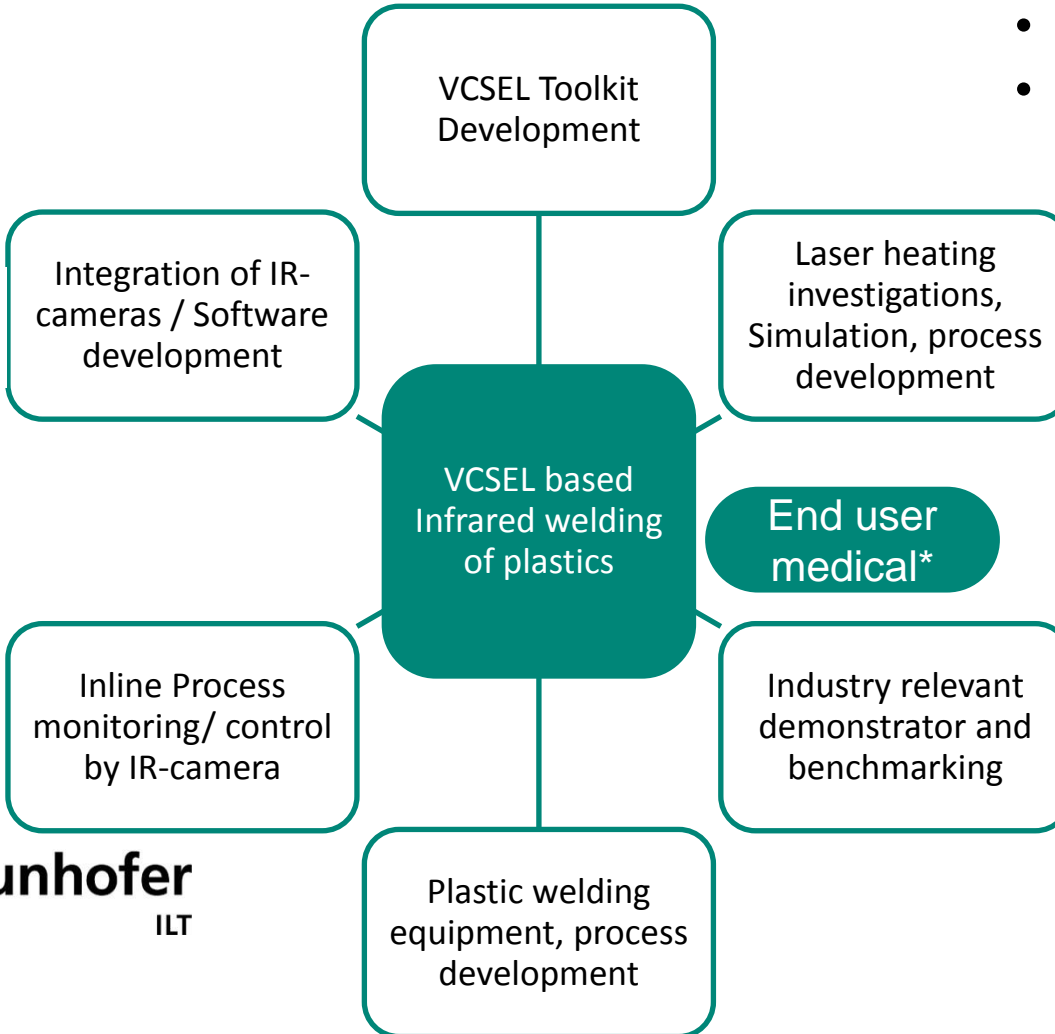
- Small blocks allow for adaption to contours
- Precise contours can be realised with masks+optics
- Cooling by water-cooled base plate
- Fast electrical control
- Energy efficient



Partners:

PHILIPS

- Laser system
- Process + controls
- Welding equipment
- Applications



Jaguar
Land Rover



Excellence in
Plastic Welding



*additional endusers optionally to be defined
→ Specification of industry relevant demonstrator for proof of concept and benchmarking against existing welding process for named demonstrator

