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# Fraunhofer support to spin-offs and technology road-maps

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Hans Dieter Hoffmann

Laser and Laser Optics  
Fraunhofer ILT

EUCALL Workshop: [Innovation Potential of Advanced Laser Light Sources](#)  
14. – 15. November 2017  
Sitges, Spain



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1. Fraunhofer Gesellschaft
2. Institute for Laser Technology
3. Cooperation with industry
4. Spin Offs



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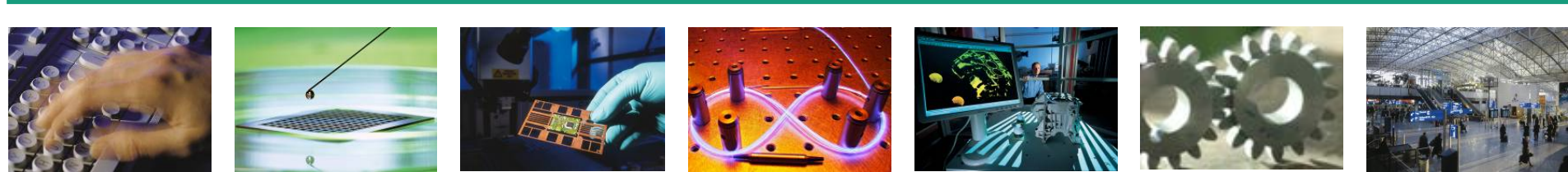
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# Fraunhofer Profile



- 69 Institutes
- 24,500 employees
- An annual financial volume of €2.1 billion, of which €1.9 billion is generated through contract research

## 7 Groups:

- ICT
- Life Sciences
- Light & Surfaces
- Microelectronics
- Production
- Materials and Components – MATERIALS
- Defense and Security VVS

# The Fraunhofer-Gesellschaft in Germany

Employees	2016
Scientific, technical and administrative staff	17 332
Students	6 654
Apprentices	472
<b>Total</b>	<b>24 458</b>



● main location

○ other location

# Position within the German Research Landscape



# Use of funding

Industrial revenues

Project contract with industry  
→  
(full cost incl. overhead)

## Market

Industrial application of precompetitive results for industrial customers

Government and EU-C revenues

Competitive public calls  
→

## Prospective Research

Precompetitive research on mature ideas and competencies

Institutional funding

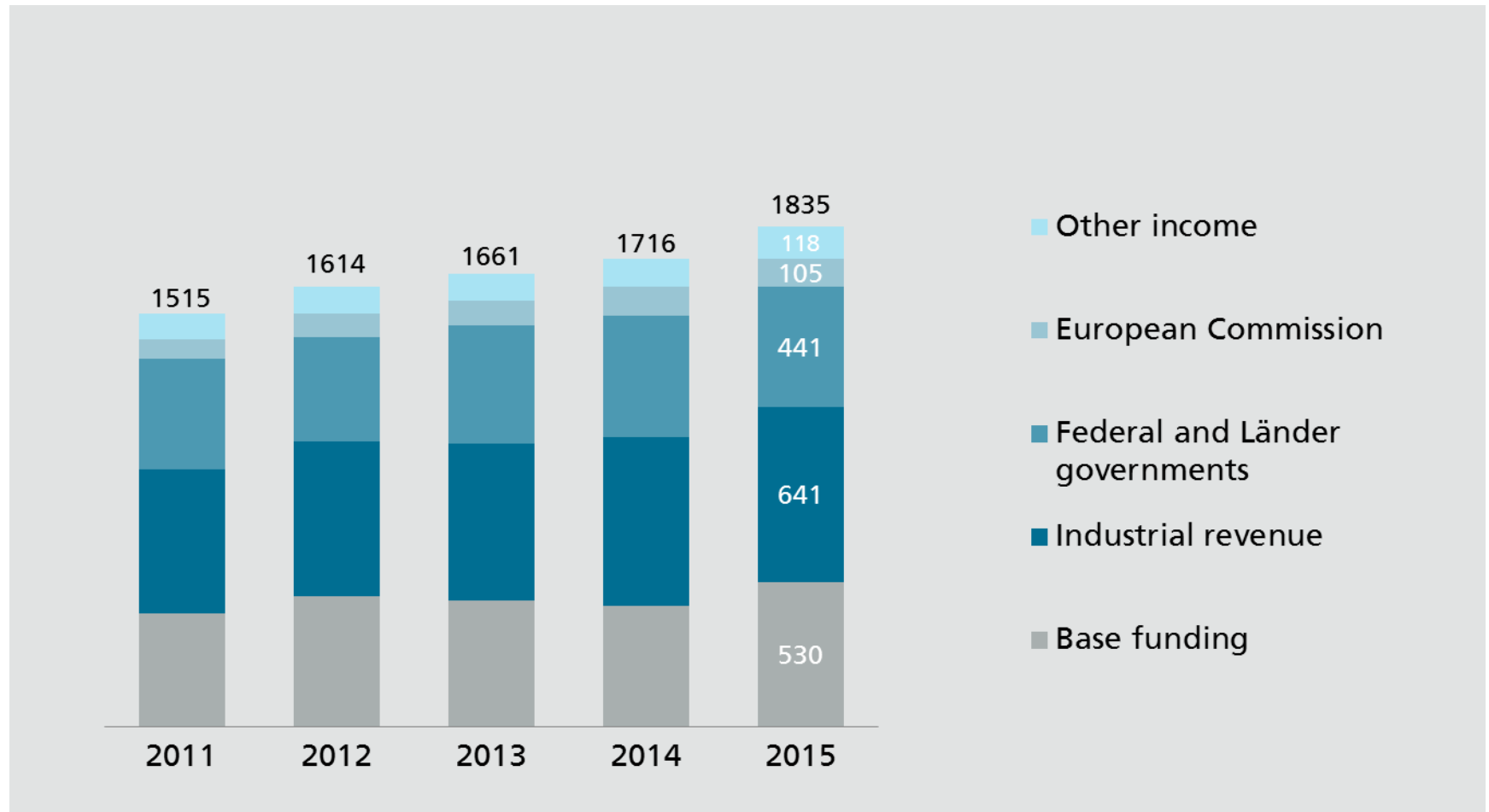
Unconditional direct grant  
→  
without deliverables

## Vision

Development of new ideas and competencies

# Contract Research

(2011-2015, in € million)

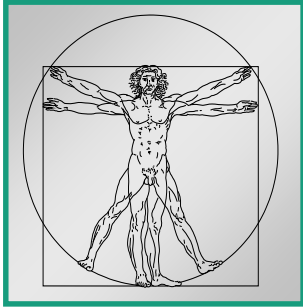




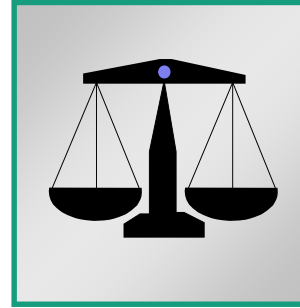
# Fraunhofer in a nutshell

- ▶ **professional R&D services to industry**
- ▶ **demand driven research combined with scientific excellence**
- ▶ **strong integration with academia**
- ▶ **autonomy of institutes combined with simple corporate rules and strong brand**

# Demands on a Fraunhofer Institute



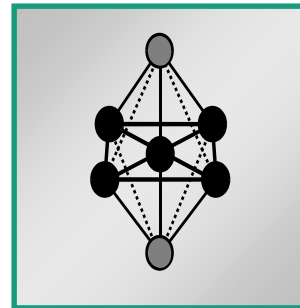
**Scientific competence**  
proved by the  
recognition of the  
scientific community



**Well-balanced financial  
mix**  
of different independent  
sources



**Market success and  
entrepreneurial  
competence**  
proved by contracts with  
industry and  
government



**Professional networking**  
with other Fraunhofer  
Institutes and externals

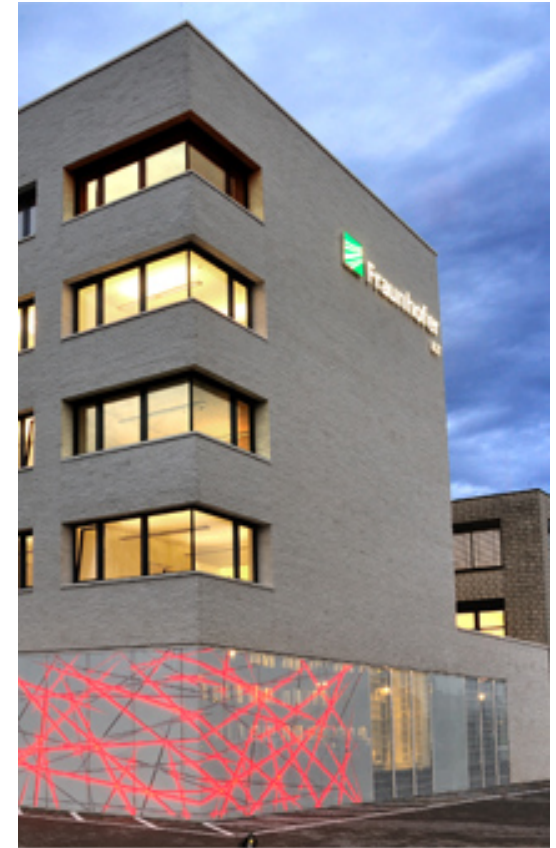
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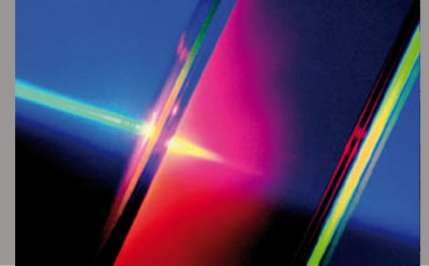
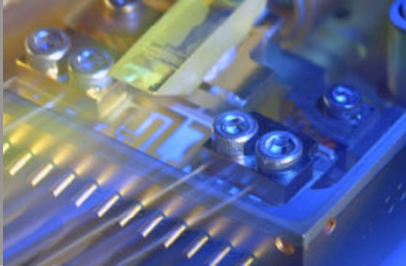


# Facts and Figures of Fraunhofer ILT

- € 31.0 M operating budget (without investments) in 2015
- 75% contract research revenue and 25% base funding
- € 4.6 M in investments in 2015
- 417 employees in 2015, of this 157 scientists and engineers, and 182 student assistants
- DQS certified according to DIN EN ISO 9001
- One patent application per month on average
- One to two spin-offs per year on average (More than 30 ILT spin-offs in the last 25 years)
- Approx. 10-15 participations in trade fairs and more than 20 organized events (conferences, seminars) per year
- Approx. 15 Ph.D. graduates at RWTH faculties per year
- Over 70 diploma, master, bachelor degrees per year



# Tailored Lasers for Industrial Use



## Laser Beam Sources

- Power / Energy
- Spatial Quality
- Temporal Quality
- Spectral Quality

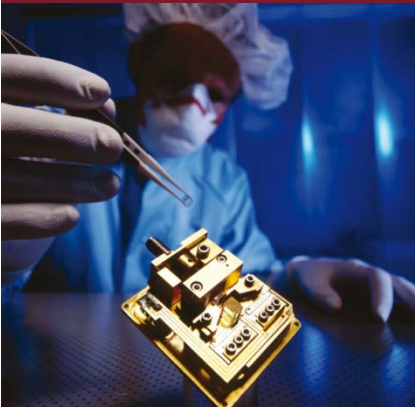


## Applications

- Manufacturing Technology
- Measurement Technology
- Microelectronics (EUV)
- Life Sciences

# Technology Focus

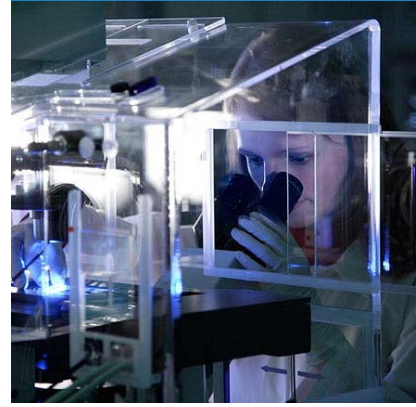
## LASERS AND OPTICS



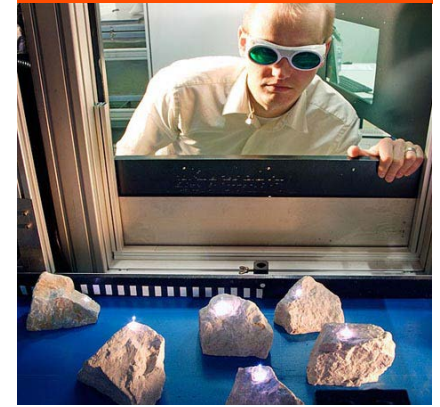
## LASER MATERIAL PROCESSING



## MEDICAL TECHNOLOGY AND BIOPHOTONICS



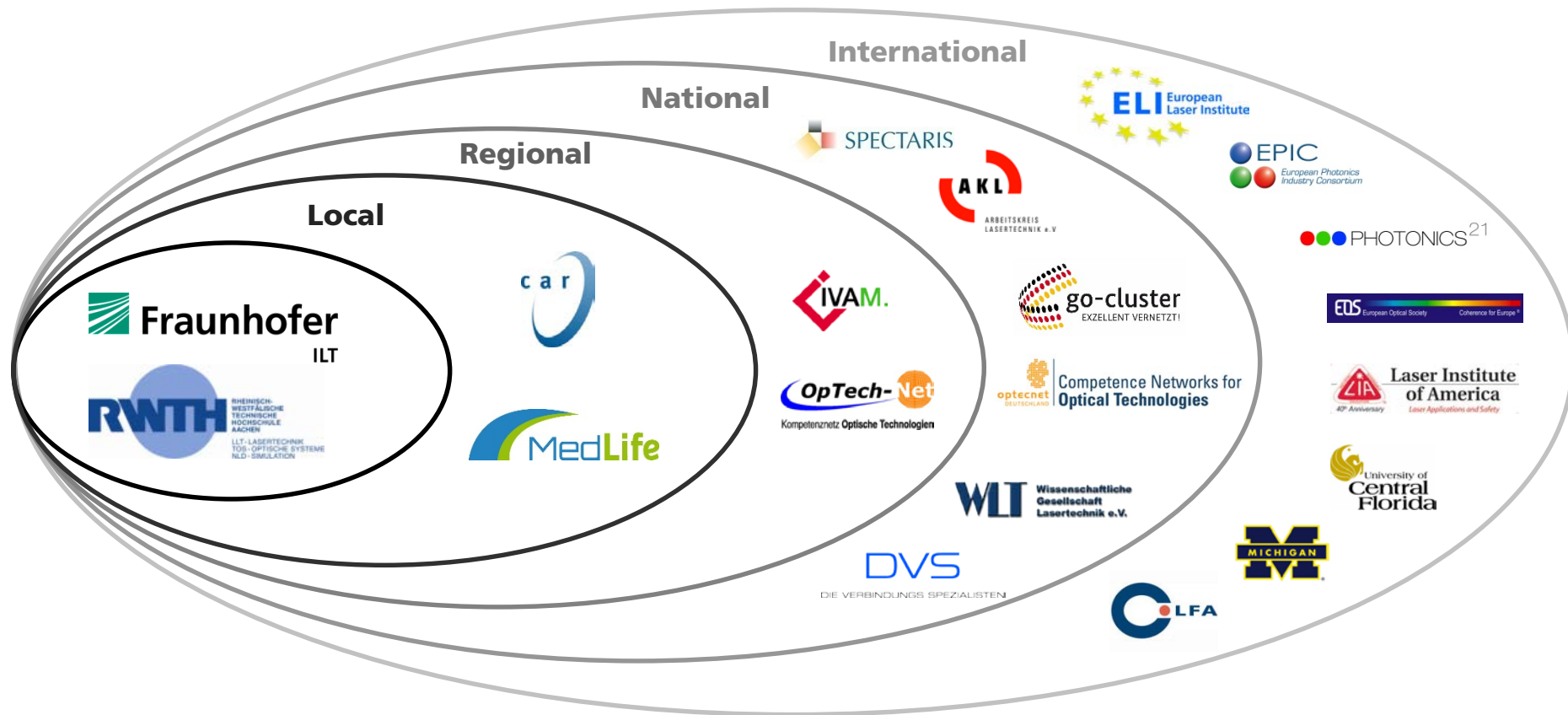
## LASER MEASUREMENT TECHNOLOGY



# Fraunhofer ILT - Networking



# Fraunhofer ILT - Networking



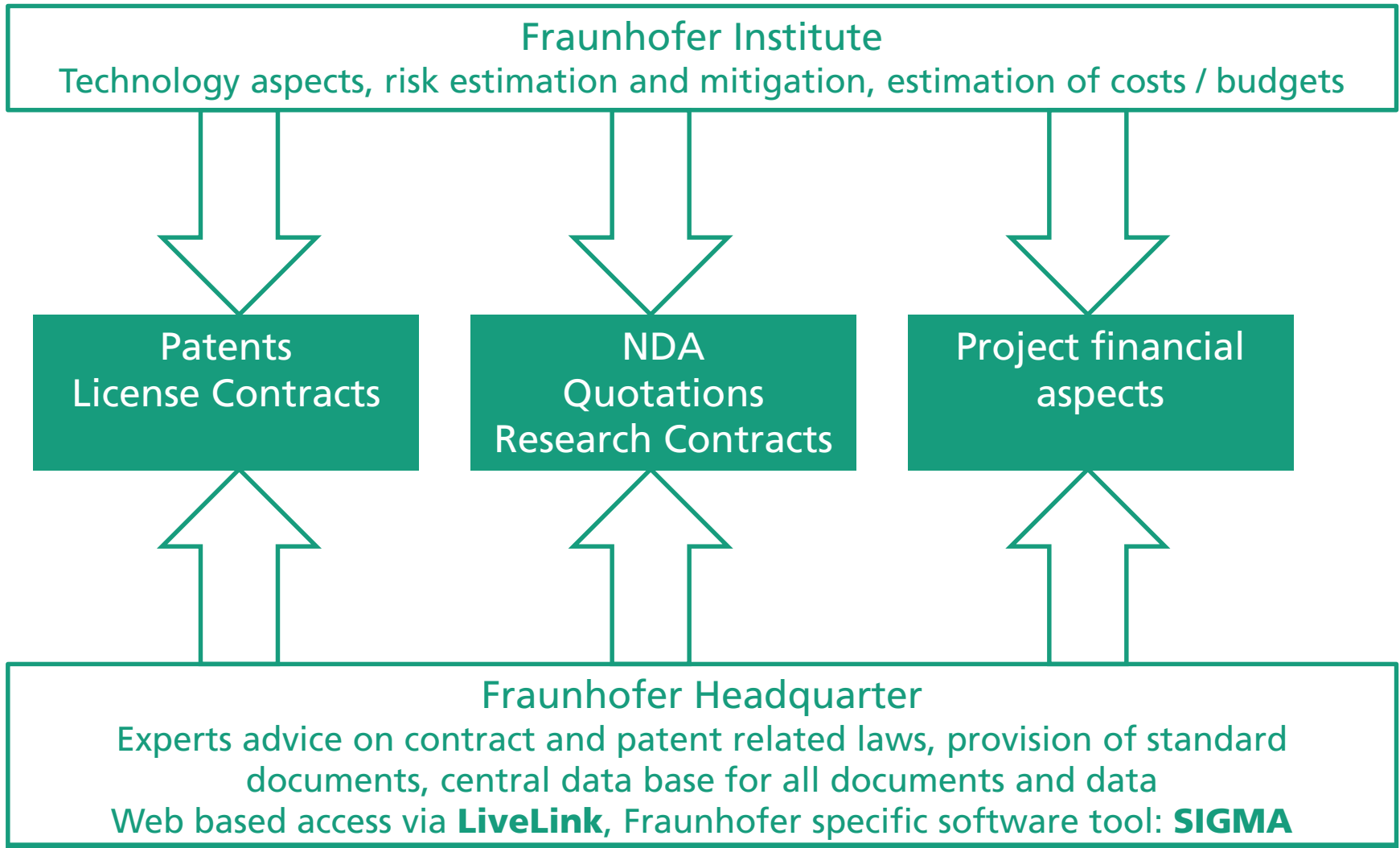


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# Support and services of the Fraunhofer headquarter (some of the most often used services)



# NDA and Research Contracts

- General Terms and conditions of Fraunhofer
  - Scope of application
  - Object
  - Fee
  - Payments
  - Rights of use
  - Third party property rights
  - Liability
  - Special Conditions
  - Statutes of limitation
  - Retention of title
  - Confidentiality
  - Publication, advertising
  - Termination

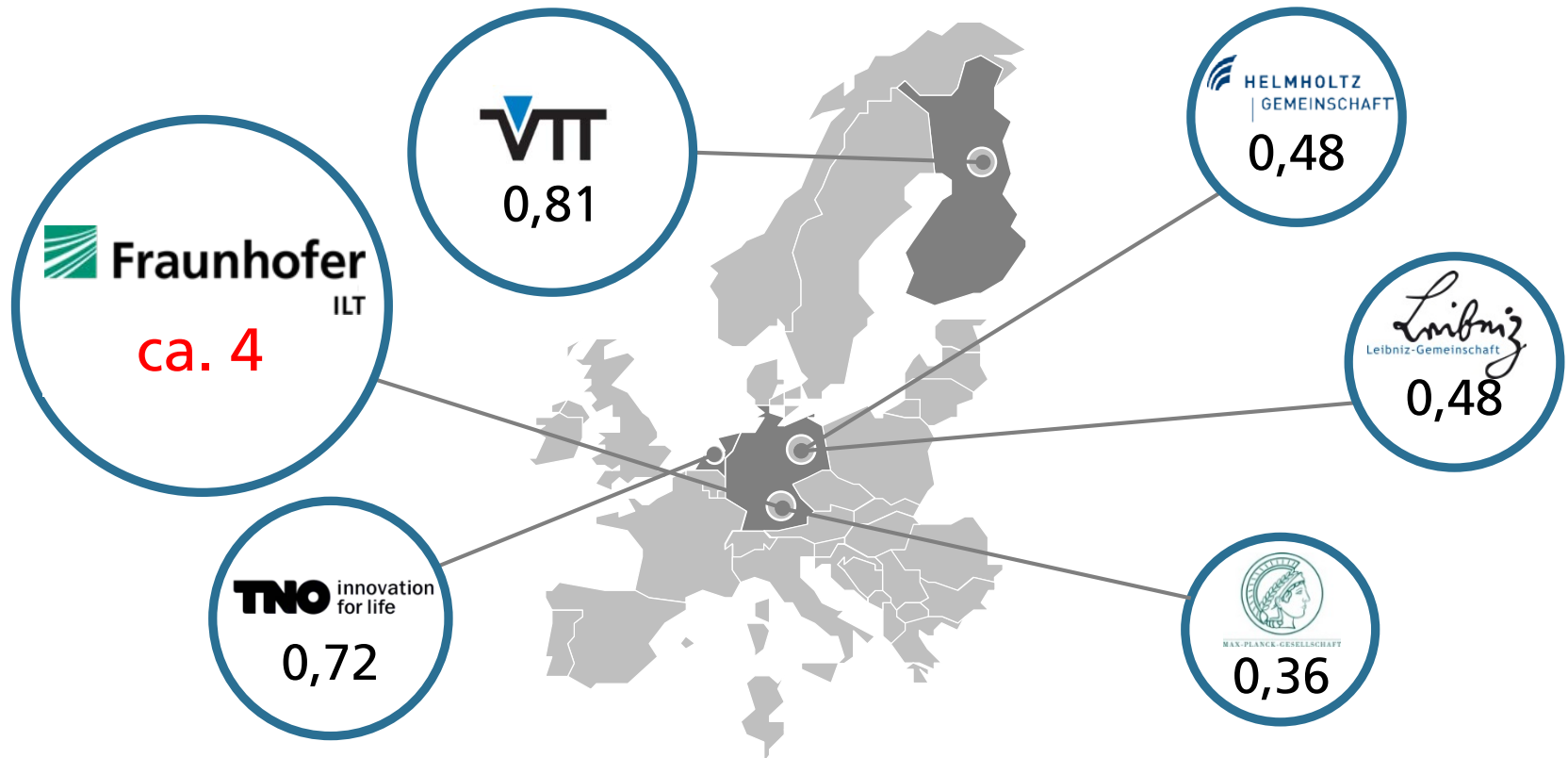
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# Start-up intensity at Fraunhofer compared to selected research organisations

Spin-offs per 1,000 employees and year\*



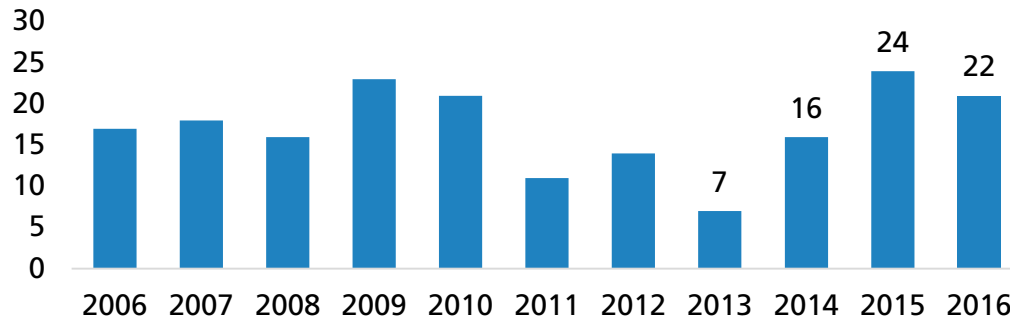
\* Period under review: spin-offs 2006 – 2015.

Source: Pakt für Forschung und Innovation, monitoring report 2016.

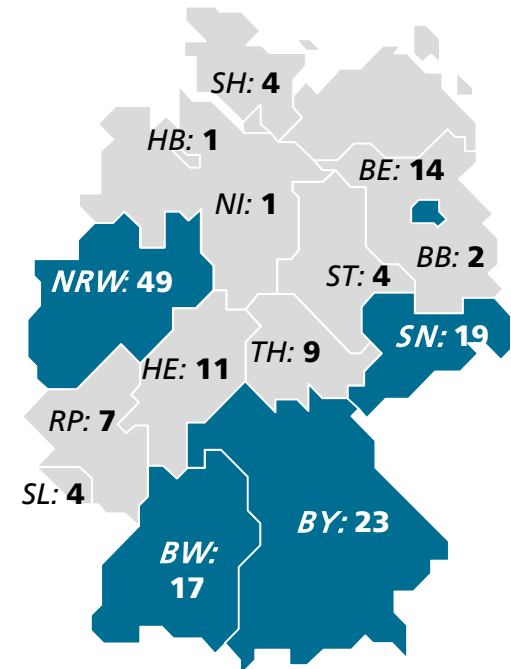
# Fraunhofer Venture – Tech Transfer via spin-offs

## I. Development of spin-off activities (2006 – 2016)

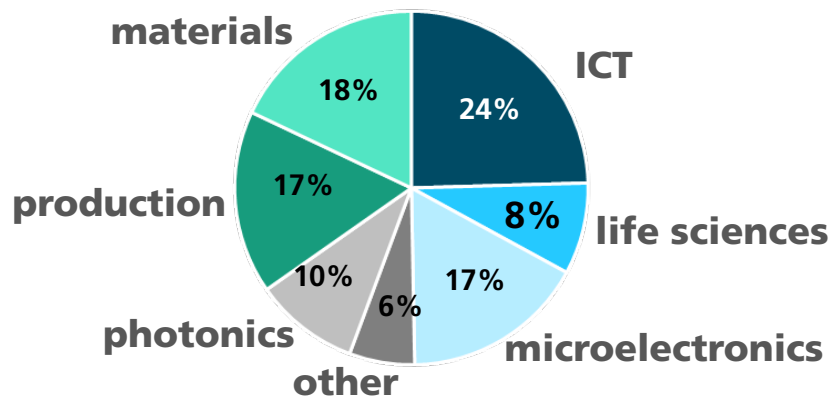
→ 189 new founded start-ups



## II. geographical distribution

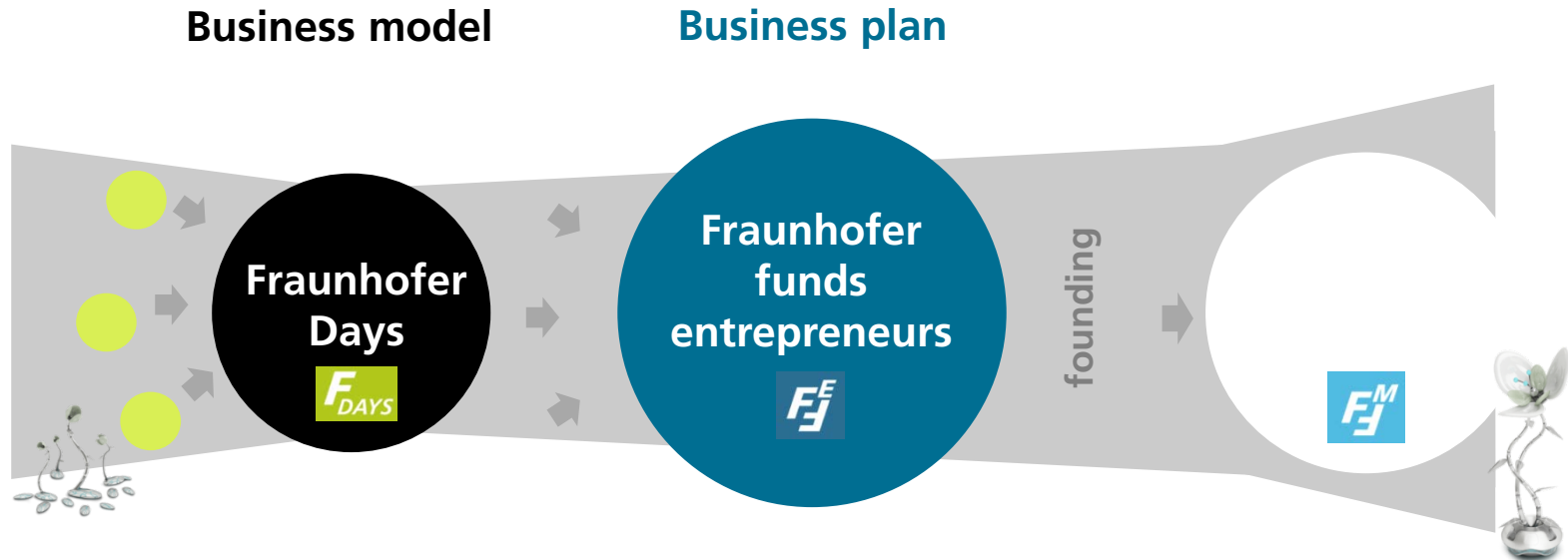


## III. Technical focus of spin-offs (2006 – 2016)



# Existing spin-off programs/activities at Fraunhofer

## I. High-performing pre-seed support process



## II. Capital



- Network to different VCs and business angels
- close relationship to the German seed investor HTGF



## III. Incentives

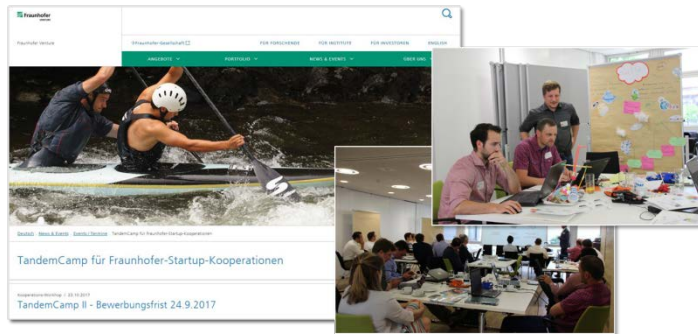


- Fraunhofer Founder Award
- Bonus for institutes

# New Tech Transfer initiatives at Fraunhofer

## I. Project ‚TechBridge‘

→ Development of close cooperations between external start-ups and Fraunhofer institutes



## II. Project ‚High Tech Pioneers‘

→ Company building & development of founding teams



Goal: Set-up and development of high-performing founding teams

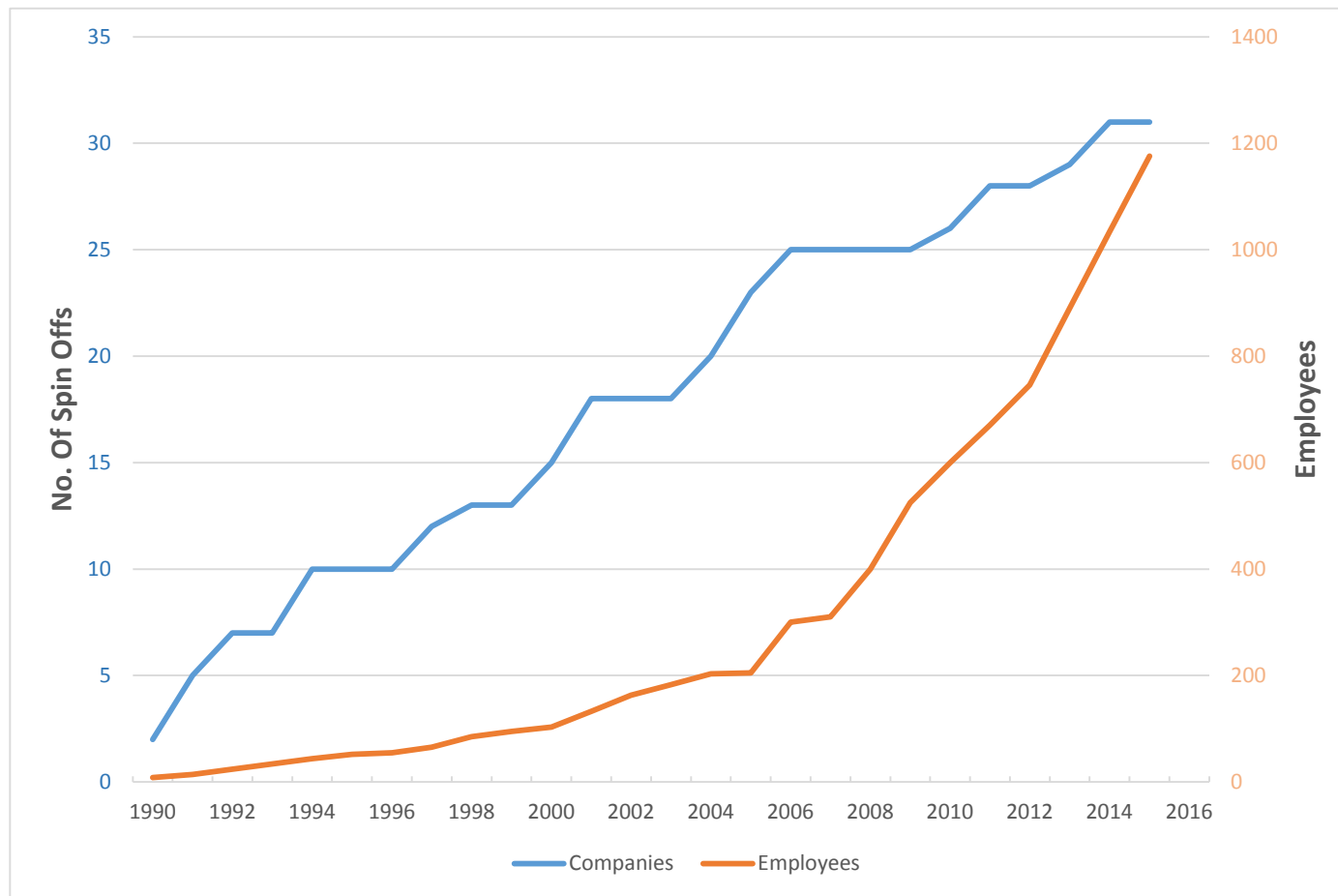
Approach: Specific integration of serial entrepreneurs (»Pioneers«)

*»What do you look for in a start-up? Our answer is **team, team and team** (followed by market, progress and idea)!«*

Michael Cohn, Managing Director beim Start-up-Accelerator Techstars

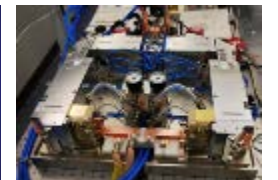


# Fraunhofer ILT - Spin Offs last 25 years



Spin Off turnover accumulated 2016: app. 230 Mio€

# Innoslab Platform - History



1994

1996

1998

2000

2002

2004

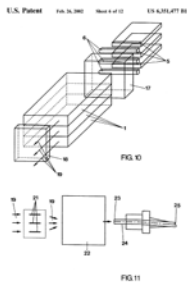
2006

2008

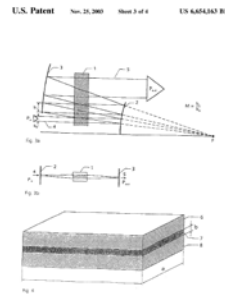
2010

2012

2014

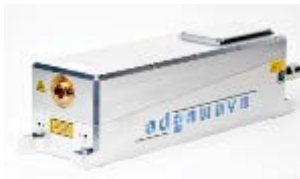


Patent  
partially  
pumped  
slab laser



Patent  
slab  
amplifier

edgewave



Foundation  
of  
EdgeWave  
2001

AMPHOS



Foundation  
of  
AMPHOS  
2010

# Fraunhofer ILT – Spin Offs



 Integrated Laser Solutions	 electronic solutions		 ELABORATING YOUR ADDITIVE PRODUCTION
			
	 FOCUSING POWER TO THE POINT		
			
			
	 HARALD DICKLER SONDEROPTIKEN FÜR DIE LASERTECHNIK		
	 Strahlwerkzeuge	 smart laser tools	 LASERTECHNIK GMBH
			 die LichtSchneiderei ZERSpanungs- & LASERTECHNIK
			



# SAVE THE DATE!

[www.lasercongress.org](http://www.lasercongress.org)

## LASER APPLICATIONS OF TOMORROW

MAY 2 - 4, 2018  
IN AACHEN



# AKL'18

INTERNATIONAL LASER  
TECHNOLOGY CONGRESS