Fraunhofer IWS

Increasing production efficiency of metallic bipolar plates by pre-coating in a roll-to-roll PVD arc process

Maurizio Giorgio, M.Sc.
Dortmunder OberflächenCentrum (DOC)

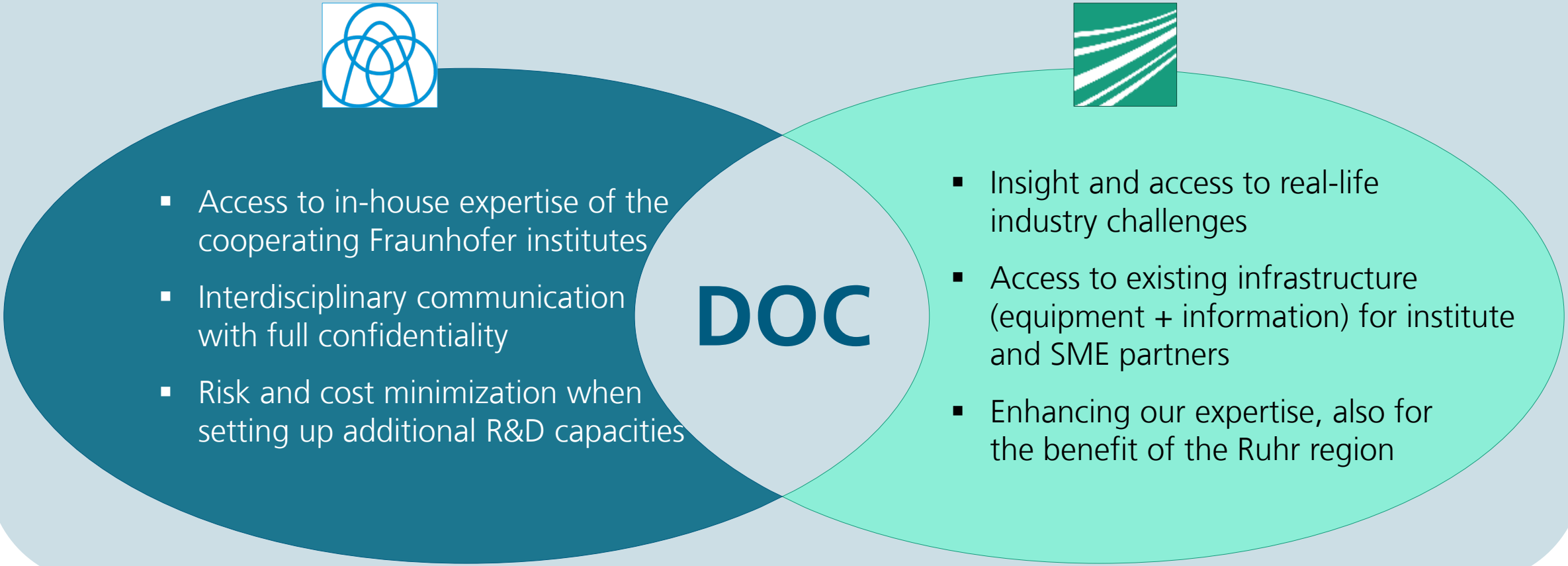
FRAUNHOFER 75 YEARS OF INNOVATION

SUCCESSFUL R&I IN EUROPE 2025
12th EUROPEAN NETWORKING EVENT

Public Private Partnership at Dortmunder OberflächenCentrum DOC®

- Motivation for the collaboration with Thyssenkrupp Steel Europe AG

Cooperation agreement for the IWS & IST project group in Dortmund



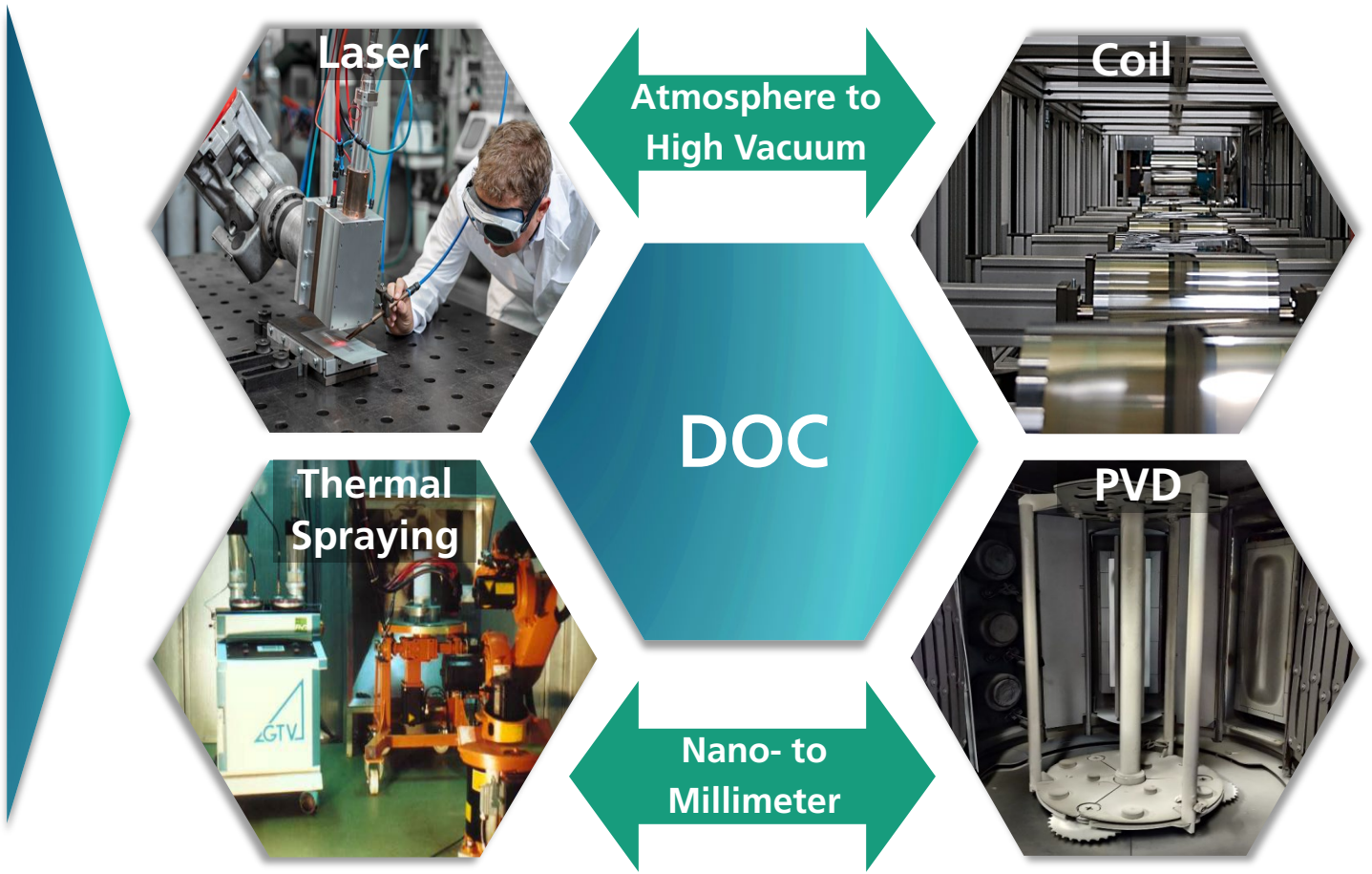
- Access to in-house expertise of the cooperating Fraunhofer institutes
- Interdisciplinary communication with full confidentiality
- Risk and cost minimization when setting up additional R&D capacities

- Insight and access to real-life industry challenges
- Access to existing infrastructure (equipment + information) for institute and SME partners
- Enhancing our expertise, also for the benefit of the Ruhr region

Fraunhofer DOC®

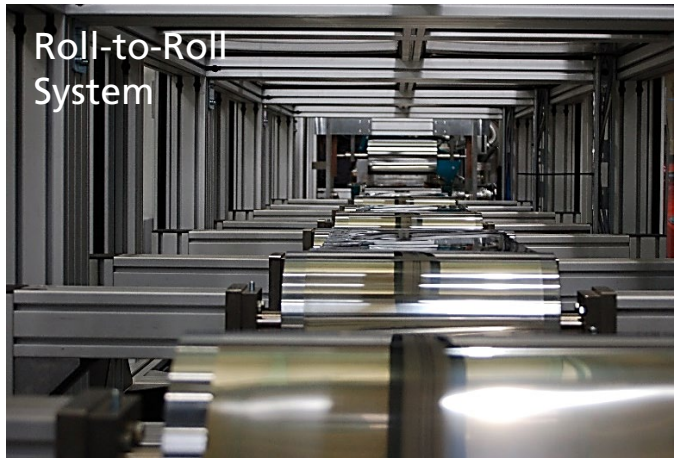
Surface Engineering

Experimental Hall

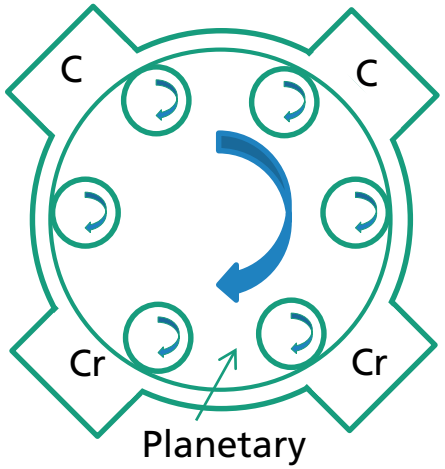


PVD Coating from Batch to Coil Process

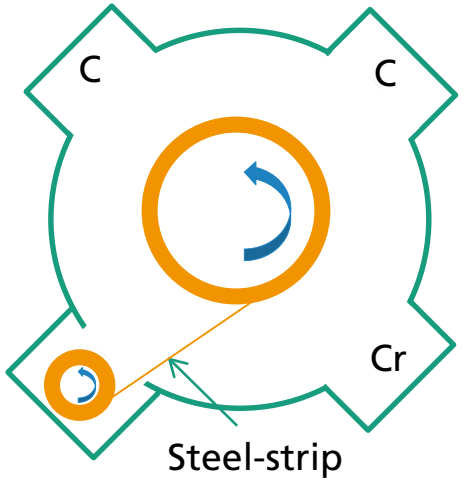
Hydrogen Technology and Circular Economy



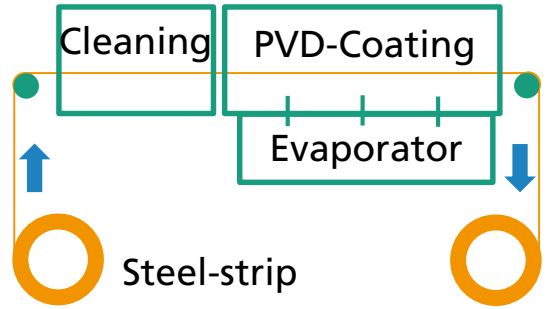
- PVD-System Batch



- PVD-System with Coil-Coating



- Roll-to-Roll System with PVD-Coating

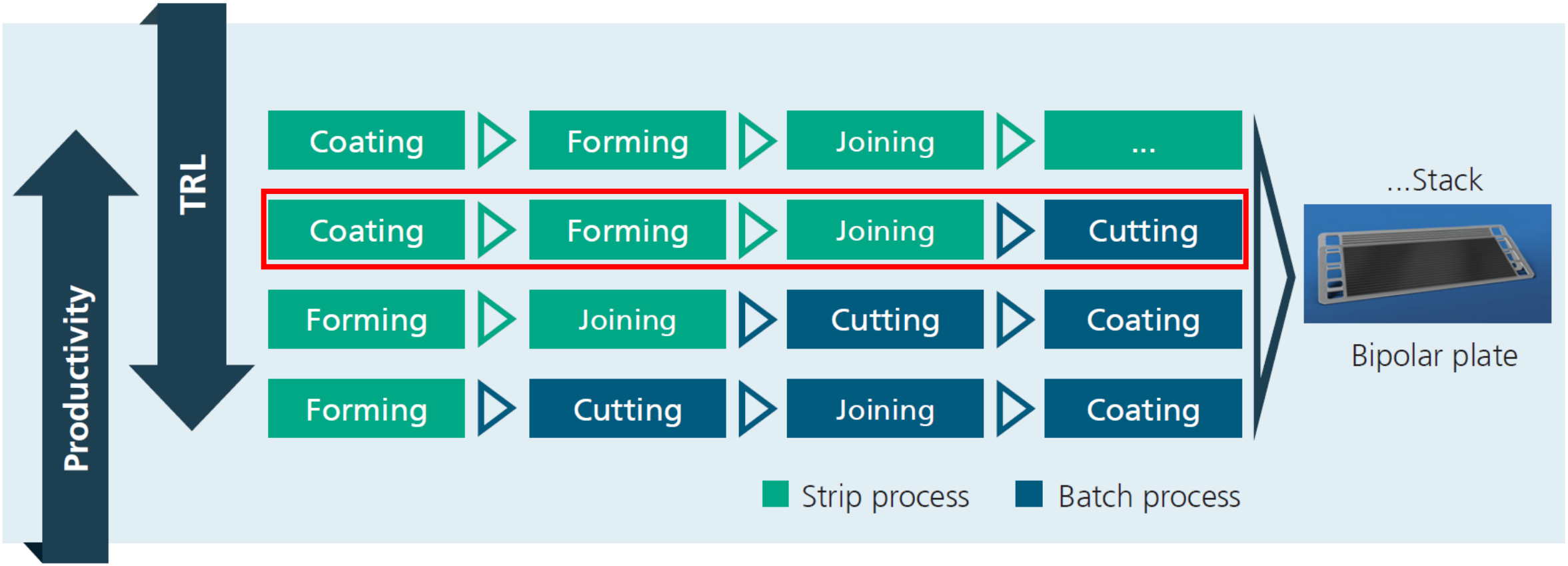


Development

- Development from **batch** to **coil** process for metallic Bipolarplates (BPP)
- **G**raphit-**L**ike **C**arbon (**GLC**) based coatings
- Very good improvement of **contact** and **corrosion** resistances (also in pre-coating)
- **Goal:** High production rate > 1 BPP per second

Bipolar plate

- Production process examples



Roll-to-roll processes have a potential for higher productivity.

Project examples

- Past and ongoing projects

Joint project miniBIP

Surface modification of metallic bipolar plates for the low-temperature PEM fuel cell

06.2012 - 06.2016

Bundesministerium für Wirtschaft und Technologie

Joint project miniBIP II

Metallic bipolar plates from strip processes for coating and forming precision strip

05.2018 - 04.2021

Bundesministerium für Wirtschaft und Technologie

Joint project HOKOME

Development of highly productive and cost-efficient R2R manufacturing methods for fuel cell stack components

01.2020 - 12.2023

Fraunhofer

Joint project H2GO

National Fuel Cell Production Action Plan (H2GO)

05.2022 - 11.2025

Bundesministerium für Verkehr und digitale Infrastruktur

Further Information: https://www.iws.fraunhofer.de/en/future-innovation/hydrogen-technology.html

We are looking for

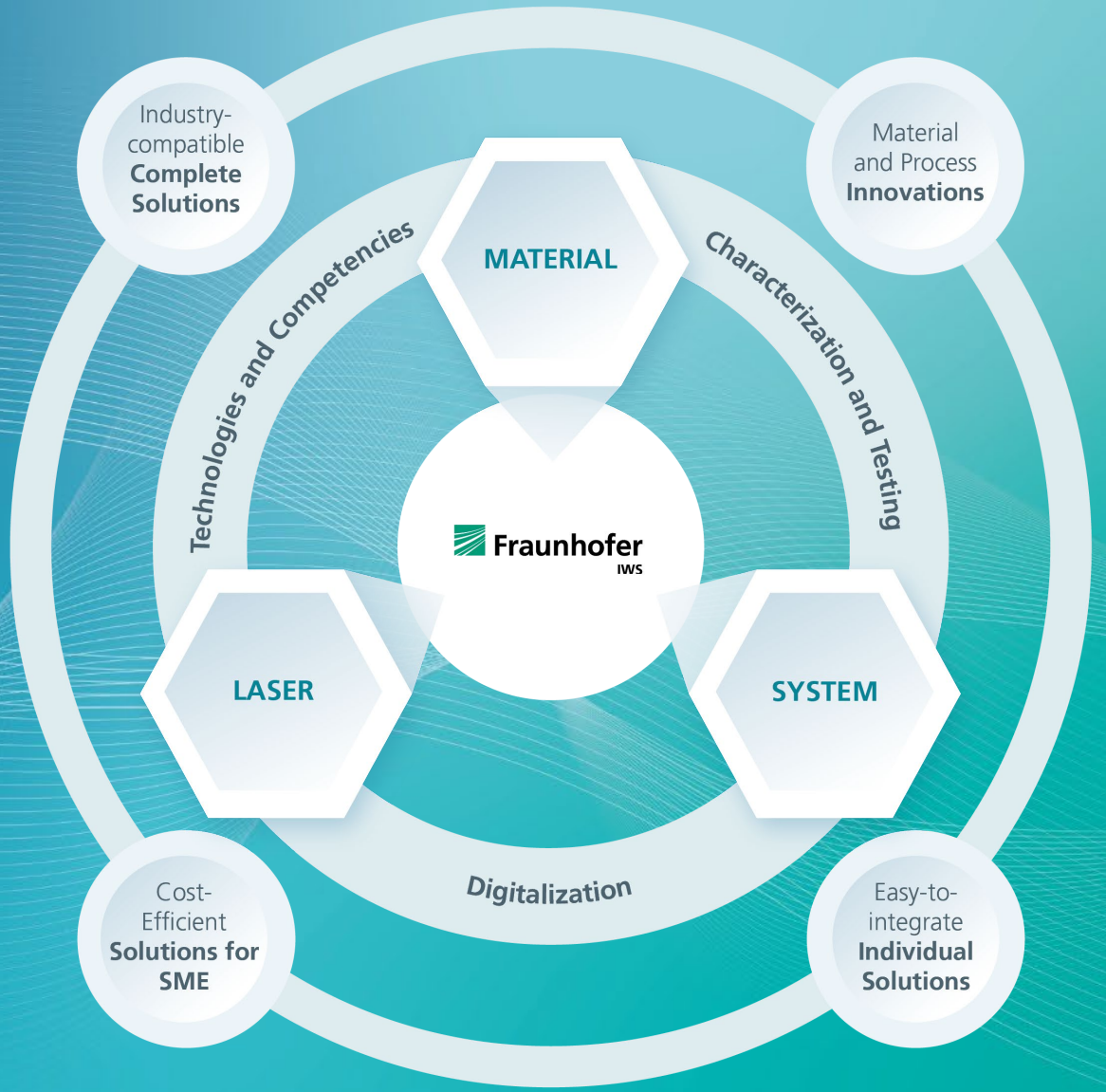
Industry and University partners for topics of Hydrogen and Coating Technology

Potential collaborators should focus on enhancing **coating systems** and **optimizing materials** for improved performance in **hydrogen applications**.

For example, partners with expertise in advanced coating technologies, roll-to-roll manufacturing and fuel cell production processes.

The goal is to further develop innovative production methods for fuel cells, ensuring high-quality coatings and efficient manufacturing processes.

We aim to accelerate the transition to hydrogen-powered mobility solutions. **Will you join us?**



Contact

Maurizio Giorgio, M.Sc.
Dortmunder OberflächenCentrum (DOC)
Phone +49 231 844-3888
maurizio.giorgio@iws.fraunhofer.de

Fraunhofer Institute for Material and Beam Technology IWS
Eberhardstr. 12
DE-44145 Dortmund
www.iws.fraunhofer.de

Fraunhofer IWS

FRAUNHOFER 75 YEARS OF INNOVATION