

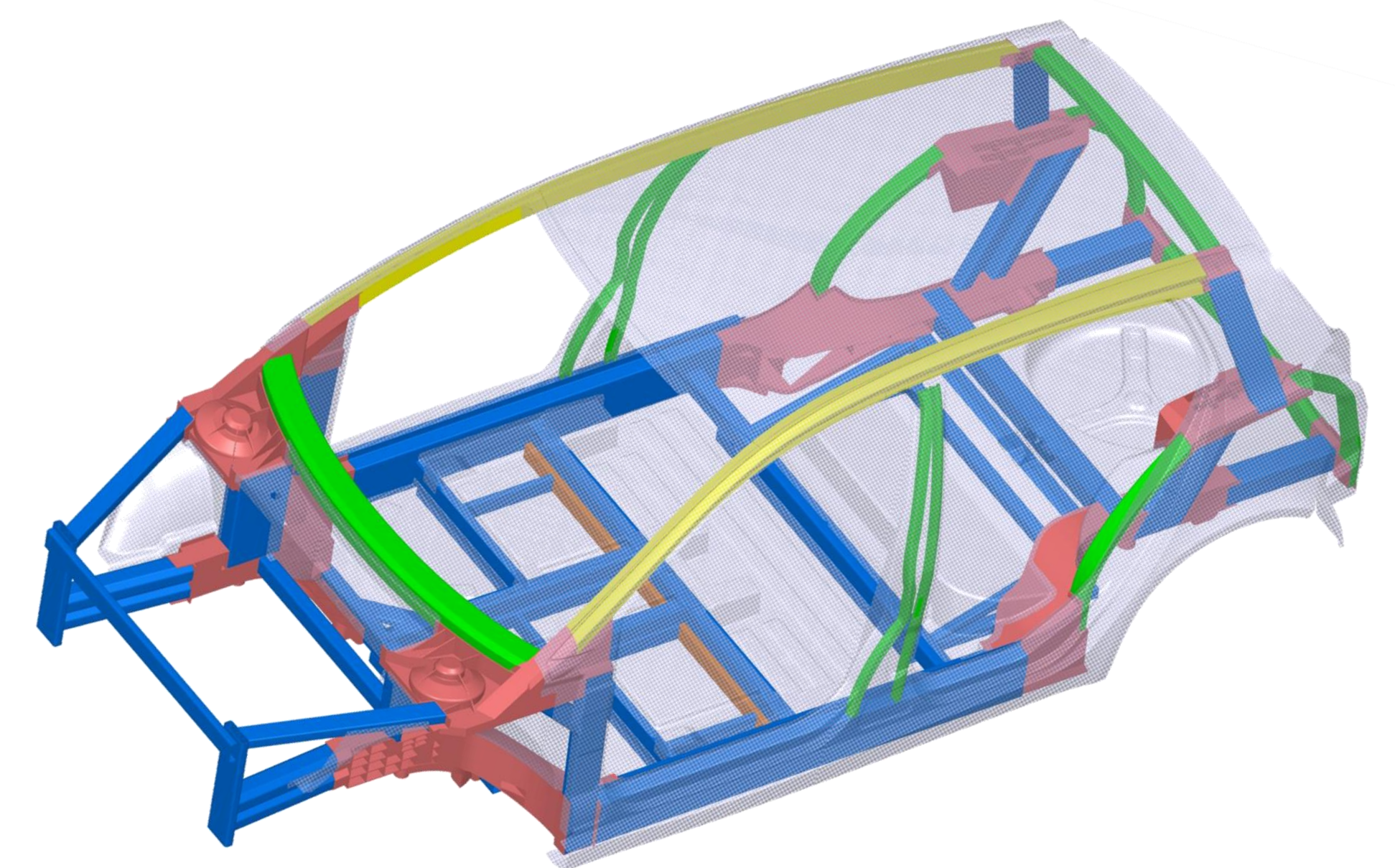
## Motivation

The passenger car's body-in-white (PC's BIW), mainly made of steel, contributes with a ratio of up to 20 % significantly to the car's curb weight offering a large weight reduction potential. The overall motivation of the project **P10** (2016/01 - 2018/12) is the substitution of welded sheet components of a PC's BIW (e.g. 'torque box') by a hollow HPDC Al-structural component (SC) exhibiting an increased stiffness and function integration at a lower unit weight in comparison to the conventional steel approach. Besides the resulting decreased fuel consumption the successful integration of this type of lightweight component in the PC's BIW will lead to increased driving dynamics and performance without loss of safety.

## Design Process

How to design a crash-relevant HPDC Al-SC for its cost-effective integration in PC's BIW?

- Design guideline for the integration of hollow HPDC Al-SC in PC's BIW.
- Potential of hollow HPDC Al-SC for BIW regarding function integration, weight reduction, crash behavior, and cost.



Institut für Kraftfahrzeuge (ika) RWTH Aachen University



Gießertechnologie an der Hochschule Aalen

## Core Production

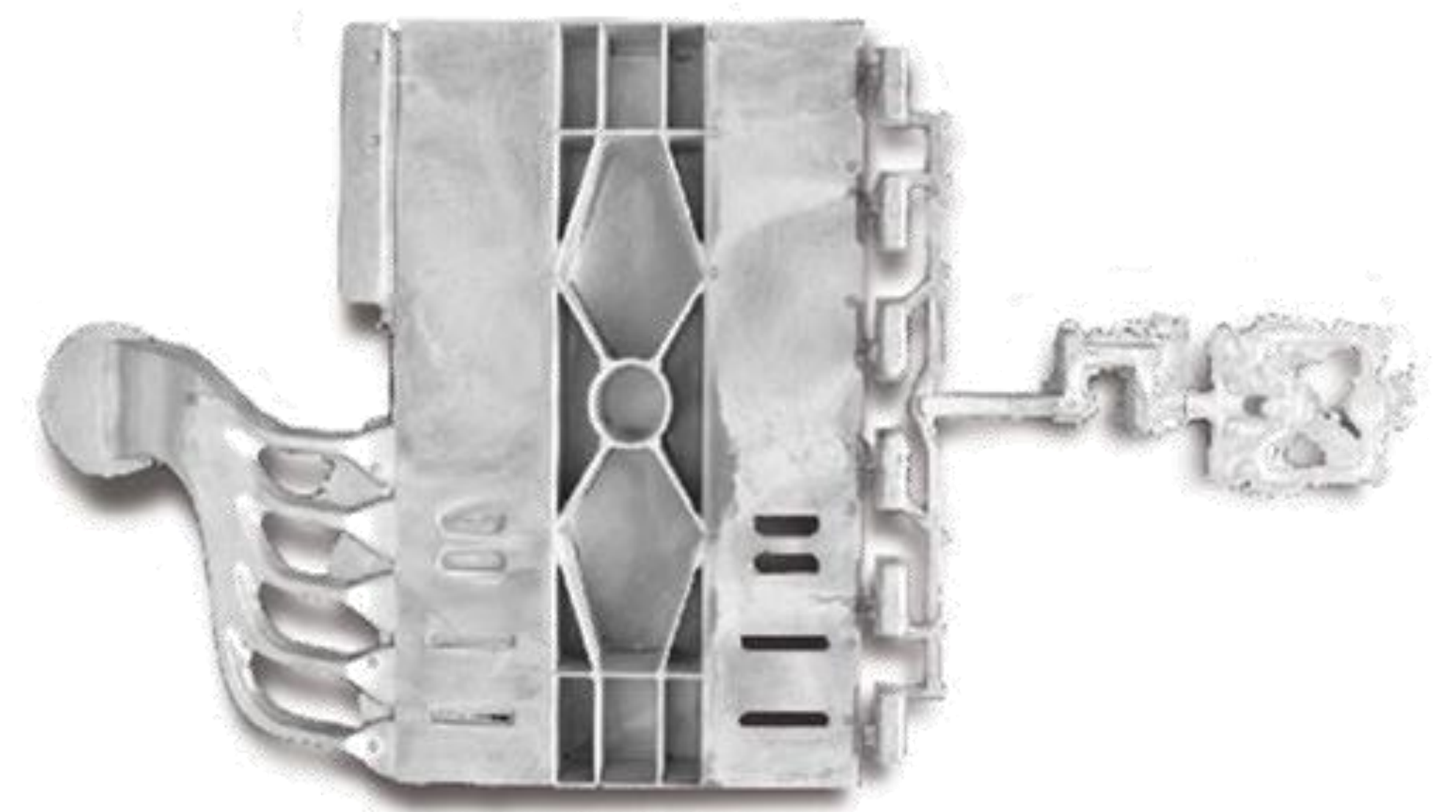
How to adapt and simulate the HPDC process to produce complex, high quality salt cores?

- Production- and material-related restrictions regarding the core's complexity.
- Optimization and validation of the salt's chemical composition.
- Thermo-physical properties of the focused salts.

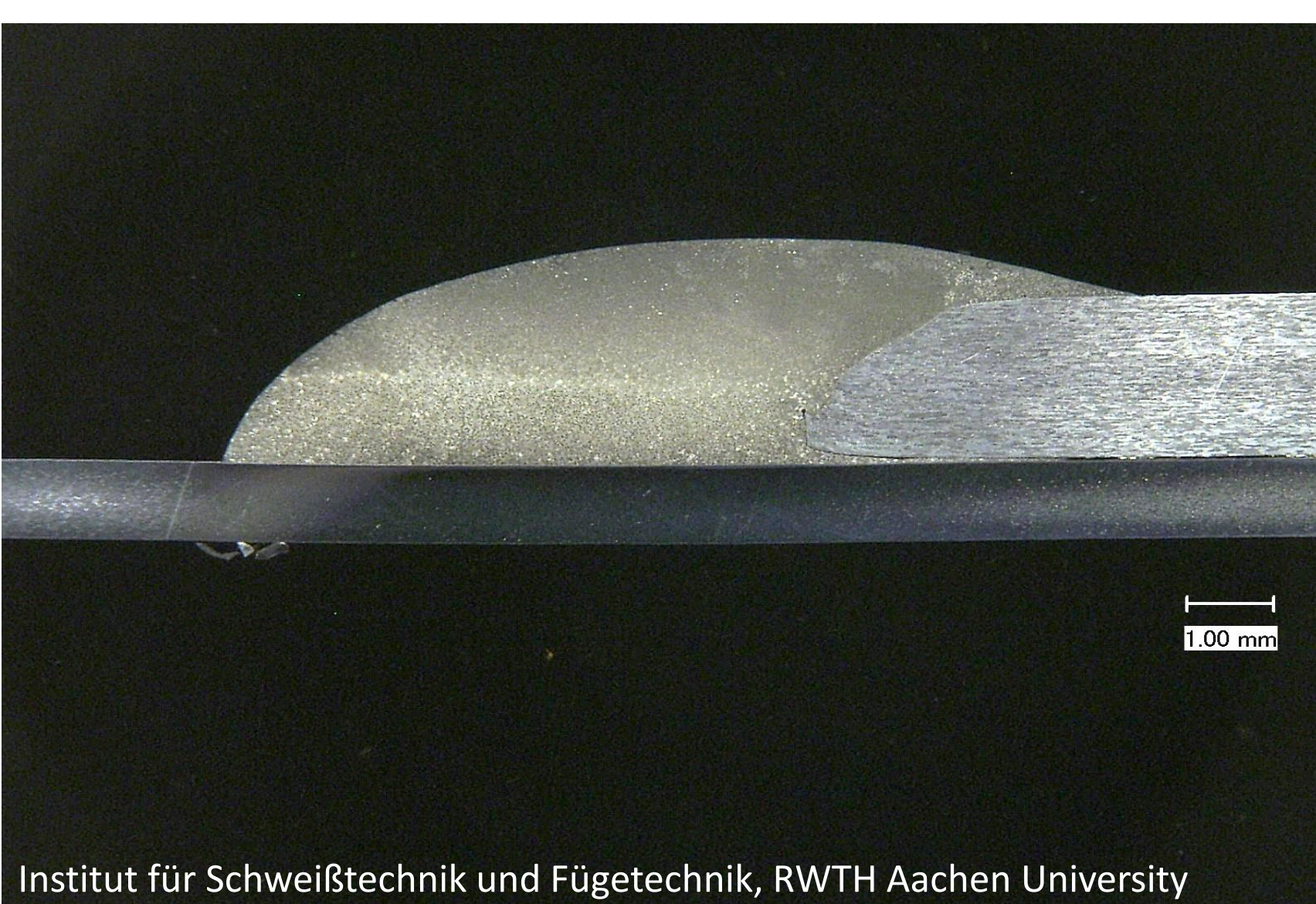
## Al-SC Production

How to adapt the HPDC process to use large salt cores and to achieve max. Al-SC quality?

- Influence of the large salt core on flow and mold filling ability, microstructure, and static and dynamic mechanical properties.
- Production-related restrictions regarding the casting's complexity.



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## Joining Technology

Which is the most suitable joining process and how is its optimal parameter setting to join complex, 'salt core-influenced', hollow, HPDC Al-SC in PC'S BIW?

- Influence joining process on microstructure and mechanical properties.
- Design rules to position the joint of the Al-SC and remaining steel BIW.
- Maximum joining speed and quality.

## Main Goal

**New process chain for the integration of hollow, complex HPDC Al-structural components in a passenger car's body-in-white is available.**

## Strategic Partnership