Integration and Test of the COSIVU SiC BJT Based Inverter

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Agenda

- Introduction
- COSIVU Inverter Integration
- COSIVU Inverter System
- Measurement Setup
- Initial Test Results
Introduction
The COSIVU project

- The EU-funded FP7 project COSIVU aims at a new system architecture for drive-trains by development of a smart, compact and durable single-wheel drive unit with:
  - integrated electric motor,
  - compact transmission,
  - full silicon carbide (SiC) power electronics,
  - and an advanced ultra-compact cooling solution.
- Project Started 2012-10-01, and ends 2015-09-30
COSIVU Inverter Integration
External connections

- CAN & 24V supply
- High voltage DC supply
- Coolant in & out
COSIVU Inverter Integration

„Plug & Play“

- EM Sensor connectors
- Leakage-free coolant connector to EM
- Coolant outlet from EM
- Pluggable AC connectors
COSIVU Inverter System
Modular Inverter Concept

3 modular „Inverter Building Blocks“ (IBB) in serial connection

Coolant inlet

Coolant outlet

24V supply & CAN communication

24V stabilizer

Inverter Controller Module (ICM)
Measurement Setup
Back-to-back test rig
Measurement Setup
Operating Points

- Initial tests done with in-house developed inverter (IGBT) – used as reference
- 11 different operating points ran as a cycle both as motor and generator
- The same cycle now also done with the COSIVU inverter (SiC-BJT)
- Inverter losses compared
Measurement Setup
Test Rig
Initial Test Results

Inverter losses [W] - REFERENCE (IGBT)

Inverter losses [W] - COSIVU (SiC-BJT)
Initial Test Results

![Graph showing initial test results comparing REFERENCE (IGBT) and COSIVU (SiC-BJT).]

- **Operating point**
- **$P_{\text{loss}}$ [W]**
- **$\Delta P_{\text{loss}}$ [%]**
Thank you!