An Integrated Platform for Engine Performance Simulations and Optimization under Diesel Conditions

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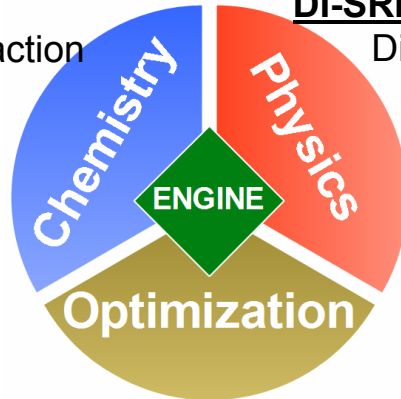**University of Magdeburg "Otto von Guericke", Germany**

Poster Location P-17

Directions in Engine-Efficiency and Emissions Research (DEER) Conference
October 3-6, 2011, Detroit, Michigan, USA

Integrated Engine Test Platform – Project Overview

❑ Integrated Approach Concept

Fuel model
Chemical Reaction
Mechanisms

DI-SRM Engine 0D
Direct Injection
Stochastic
Reactor
Model

Chemistry · Physics · Optimization · ENGINE

OPAL
OPtimization ALgorithms \ Genetic Algorithms

❑ Overall Simulation Method

Fuel model & DI-SRM
Baseline Model

Experimental Data
Verification

DI-SRM Engine
Applications

Optimizer
Self-Calibration

Optimizer
Model Training

■ DI-SRM for Diesel engine simulations

■ Engine performance and emissions

■ Detailed chemistry but still low CPU (up to < 5sec per engine cycle)

■ Fuel testing under Diesel conditions

■ Full cycle performance simulations

HC [g/kWh] (C_7H_{16})

Engine – Fuel Interaction optimization under Diesel conditions

⬇

Best output performance Low engine-out emissions

Initial Temperature (K) — 340, 360, 380, 400, 420

Initial Pressure (bar) — 1.45, 1.55, 1.65, 1.75