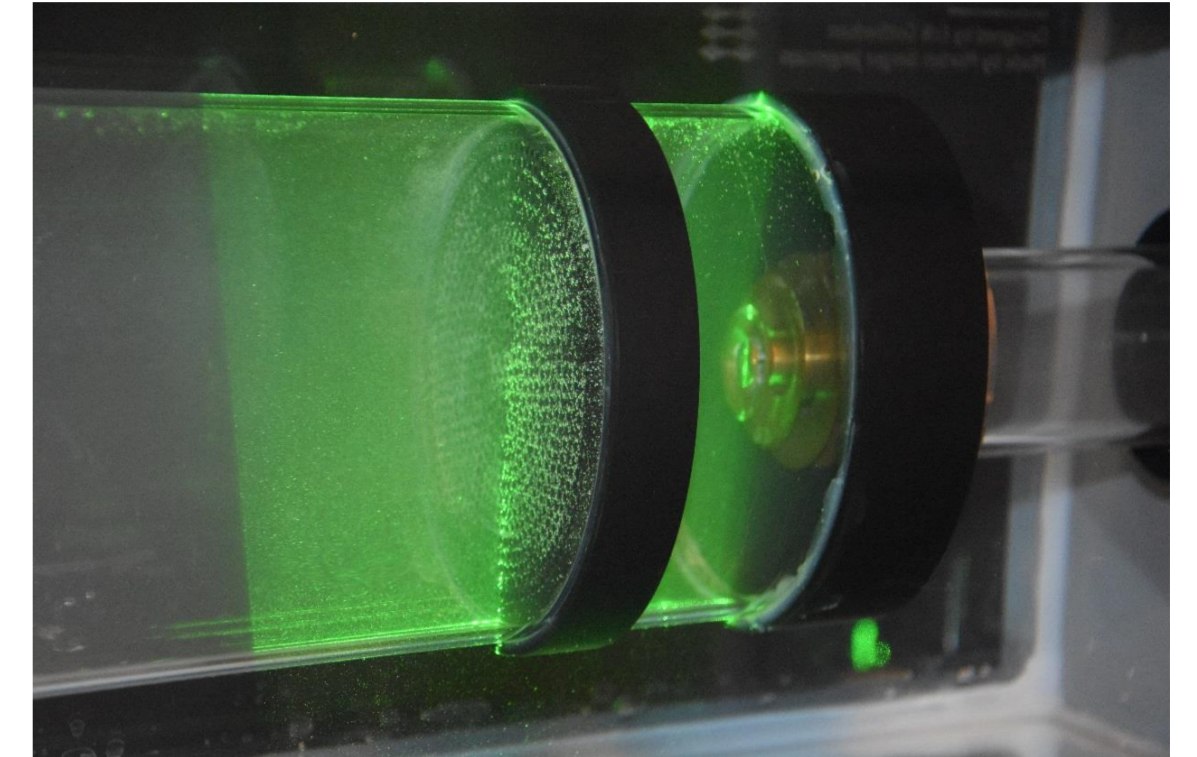


WP 8: Engine integrated SCR and combined SCR and DPF



WP OBJECTIVES

- Investigation of LP and HP SCR processes like urea injection, mixing, decomposition and flow distribution to design more compact SCR systems
- Installation and test of a new integrated HP SCR design on the 4T50ME-X R&D engine
- Adaption and integration of a compact after-treatment system for the combined PM & NO_x reduction on the 12V175D R&D marine distillate engine



Experimental setup for investigation of pulsation phenomena in Lyngby

ACHIEVEMENTS & FINAL RESULTS

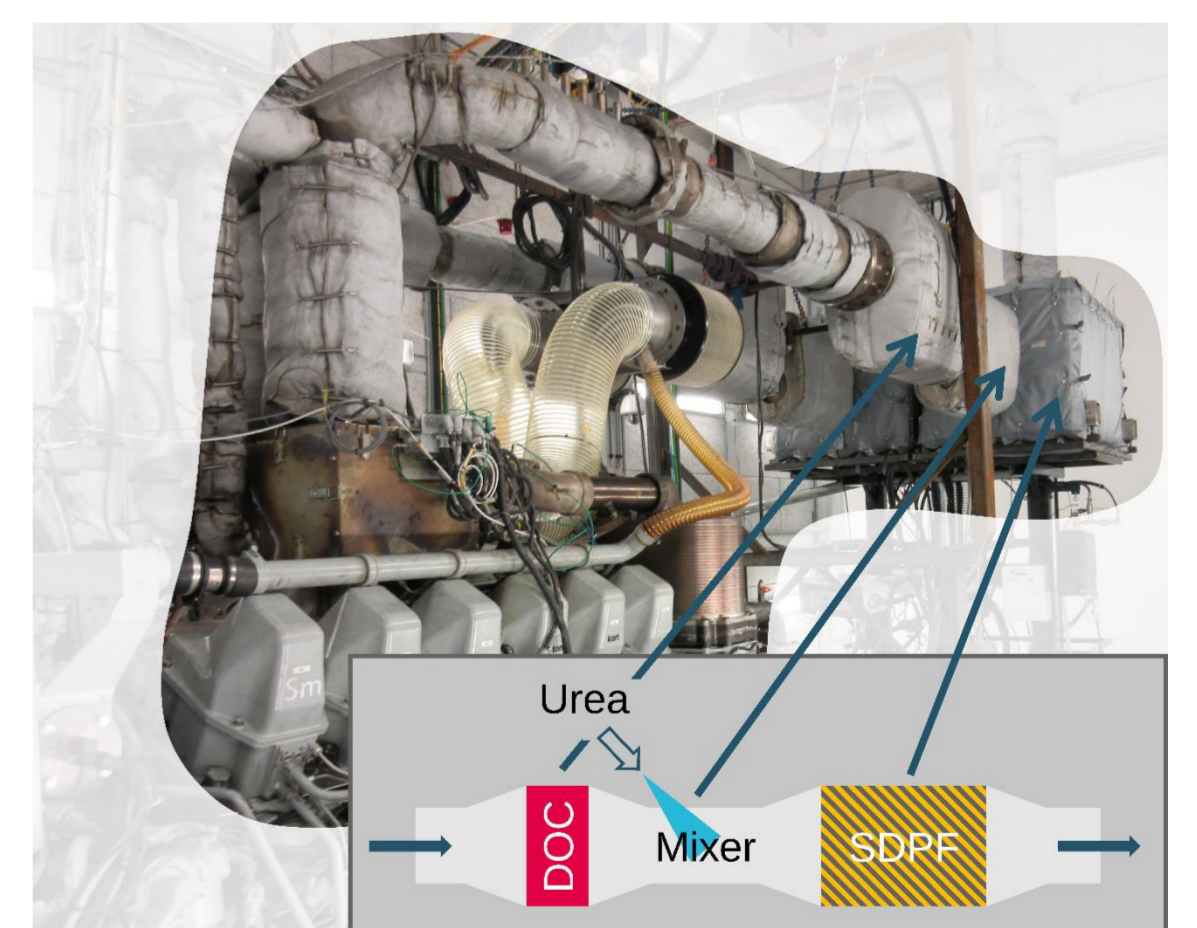
- Characterization of fluid phenomena in a simplified SCR reactor with pulsating flow for optimization of flow conditions and validation of numerical models
- Set-up of a hot gas test rig and investigation of the urea injection, mixing and decomposition processes under the influence of temperature and pressure
- Set-up and investigation of an ammonia generator as a compact device for urea decomposition in the hot gas test rig
- Good agreement of experimental characterization and numerical simulation of spray breakup and flow profile
- HP SCR process investigated in pilot scale testbeds before scale-up
- Engine integrated HP SCR designed, installed and successfully tested on the 4T50ME-X R&D engine in full-scale
- Reduction of the required installation space of the new HP SCR design by more than 90 % compared to traditional HP SCR systems
- Measurement device for traverse NH₃ measurements developed and tested on the 4T50ME-X R&D engine
- Benchmark of SCR coated DPF in laboratory scale based on measurements in a synthetic gas test bed as well as BET and SEM/EDX investigations
- Investigation of a full-scale EAT system comprising SCR coated DPF (SDPF) and a sulphur resistant DOC, which provides the required NO₂ for the passive soot regeneration, on the 12V175D R&D marine distillate engine
- Fulfilment of the 80 % PM and NO_x reduction based on IMO Tier II engine out emissions with the compact SDPF system



Hot exhaust gas flow rig for investigation of urea injection, evaporation and mixing in Hannover



Integrated SCR receiver installed on a 4-cylinder two-stroke R&D test engine in Copenhagen



EAT system comprising DOC, mixer and SDPF installed on a 12-cylinder four-stroke R&D test engine in Frederikshavn

WP PARTICIPANTS

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