Competence Center for Gas Exchange

CCGEx

"Charging for the future"

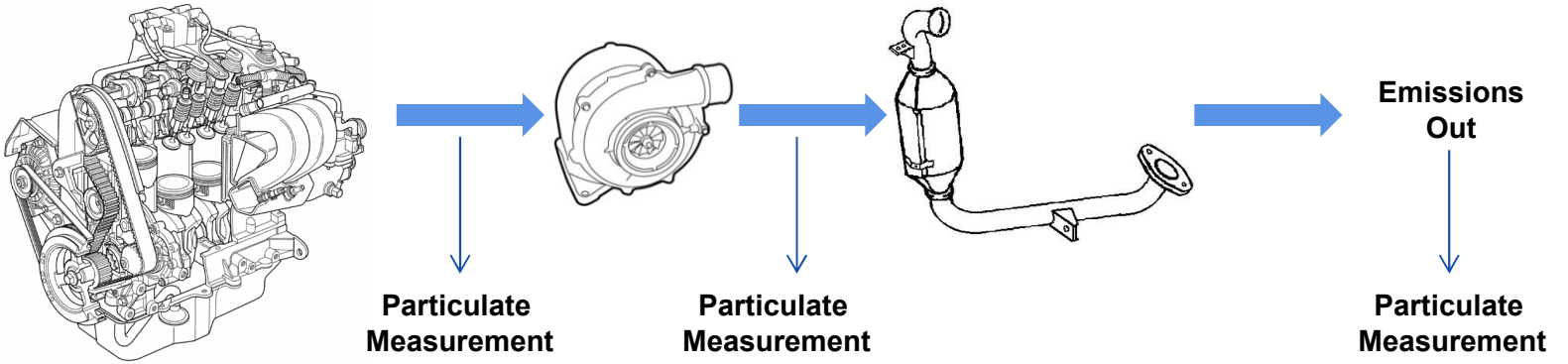
KTH ROYAL INSTITUTE
OF TECHNOLOGY

Characterization of particulates in the gas exchange system of DI/SI engines

-Arun Prasath K

Initial phase of the work

- Setting up the engine for experiments with particulate measurement systems
  - Fixing the measuring conditions like dilution ratio, temperature, etc.
  - Arriving at appropriate particulate measurement systems
  - Experimenting fixed load points at constant speeds
- Effect of pipe geometries (straight pipe, bends, expansion, etc.,) on particle size distribution with steady flow experiments
- Looking up the previous work done in particulate measurements and characterization

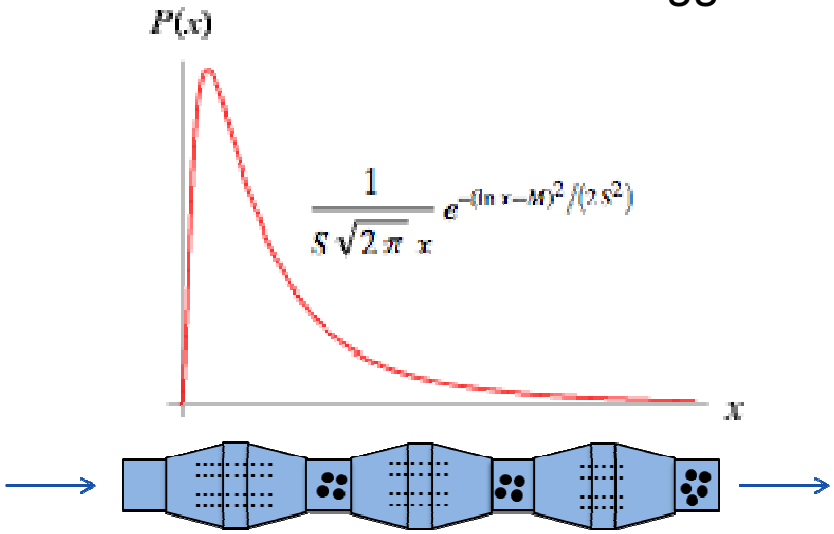


Outline of the work

- Setting up the engine for steady state load conditions
  - Use of experimental data for 1-D model generation based on engine parameters
  - Finding the independent variables for the particle number distribution
- Experiments on the engine for transient load conditions
  - Refining the 1-D model based on transient response
- Concept development and designing of agglomeration device
  - Testing of the device in steady state and transients
- 1-D model development for the agglomeration device
  - Validation and refining with actual experimental data
- Implementation of the 1-D model generated in GT power
  - Checking for the accuracy of the model

Particle number distribution in the exhaust

- Particle number distribution – bimodal log normal distribution
  - Variables S(Standard Deviation), M(Mean), Maximum number
- Finding the correlation of variables with engine parameters
- Evolution of the variables along the exhaust system between devices and the agglomeration device



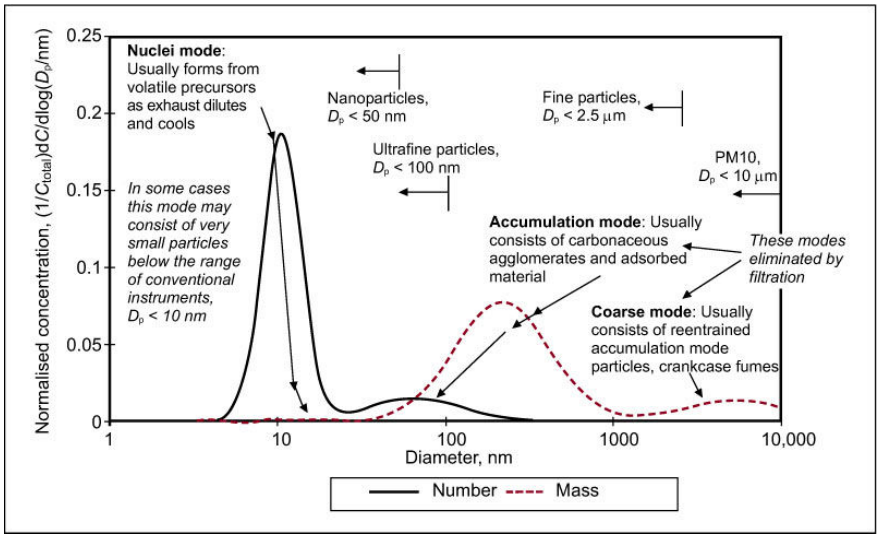


Image Ref: Prof. David Kittelson, University of Minnesota

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