Virtaussimulaatioseminaari Dipolissa 29.3.2007

Developing CFD submodels of chemical processes in combustion

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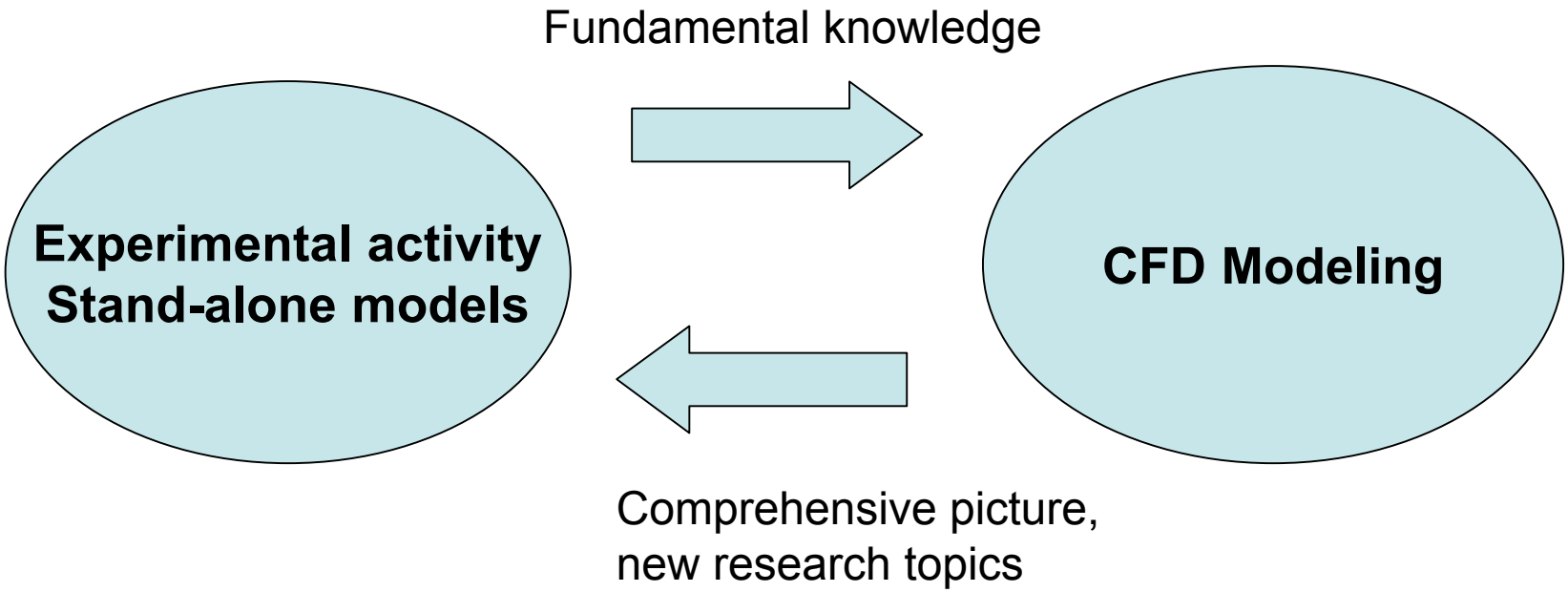
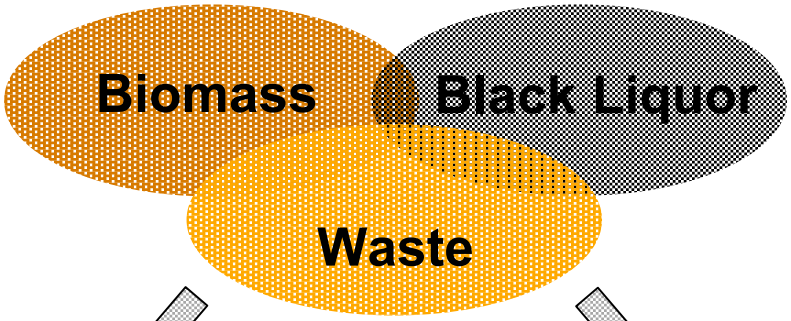
Use of CFD at Åbo Akademi



Competence Areas at ÅA PCC



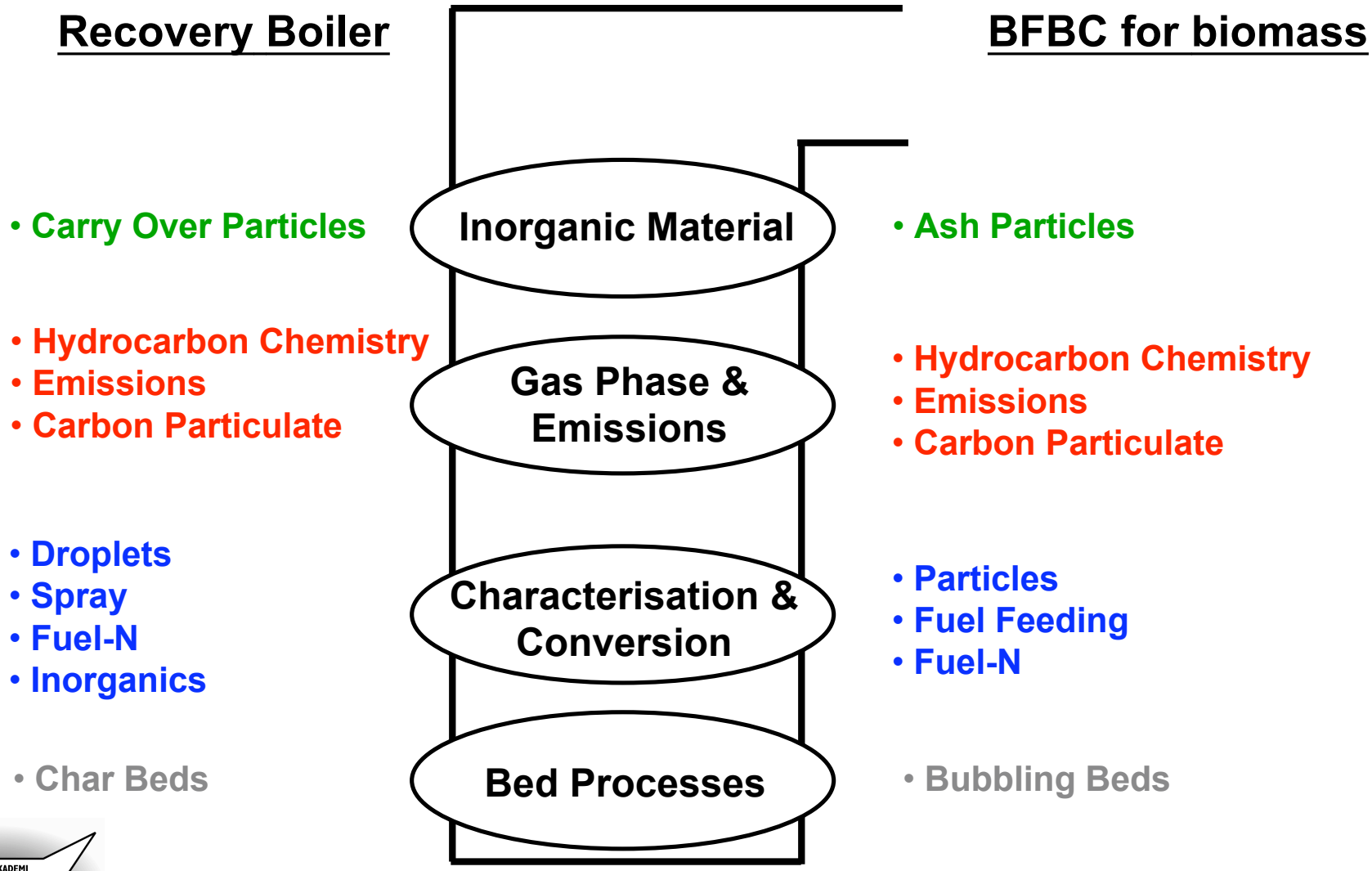
Characterisation & Conversion

Gas Phase & Emissions

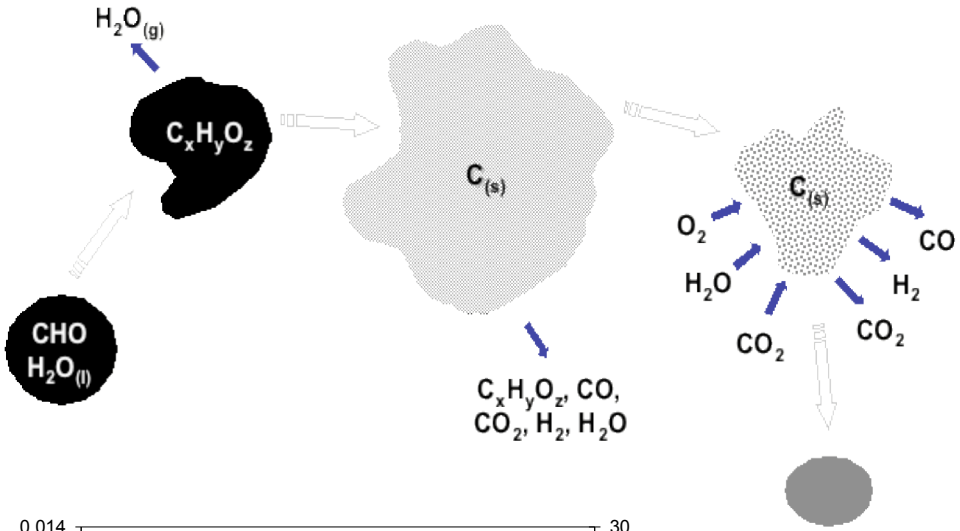
Inorganic Material

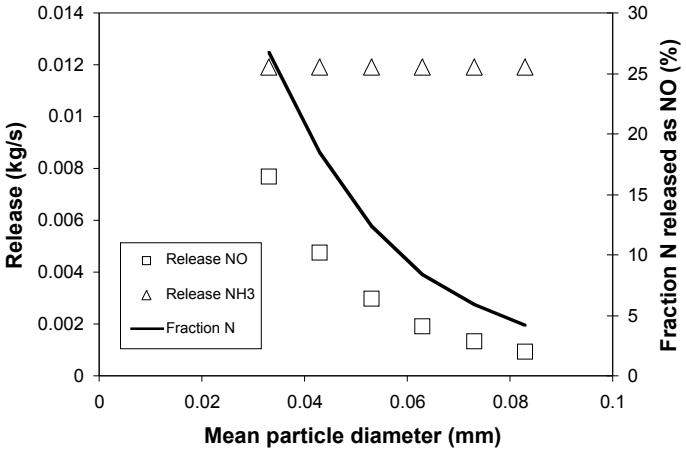
Bed Processes

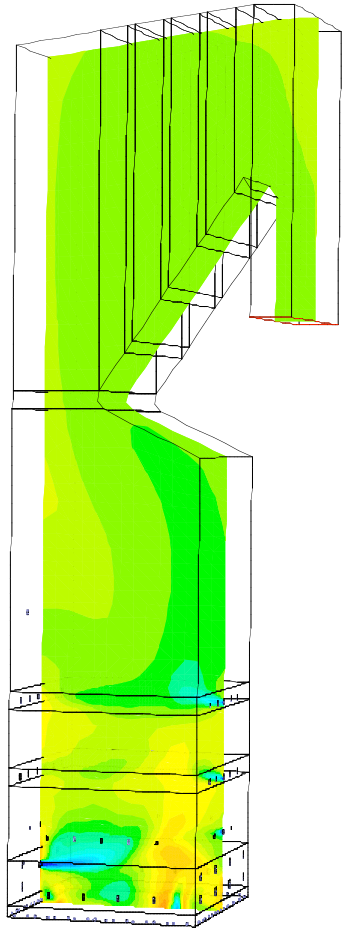
Sub Model Development at ÅA PCC



Black Liquor







Åbo Akademi Furnace Model

- **ÅA Furnace Model** based on commercial CFD software Fluent
- Utilisation of standard pre- and post-processing
- Utilisation of selected standard submodels

→ Development of **application specific submodels**

→ Collaboration with Fluent Europe Ltd., Sheffield

Demands, concerns, approaches

Turbulence modeling
Concerns: jet modeling, mixing

Turbulence-chemistry
Approach: own submodels, 21-species reaction scheme
Concerns: complex chemistry known but cannot be used

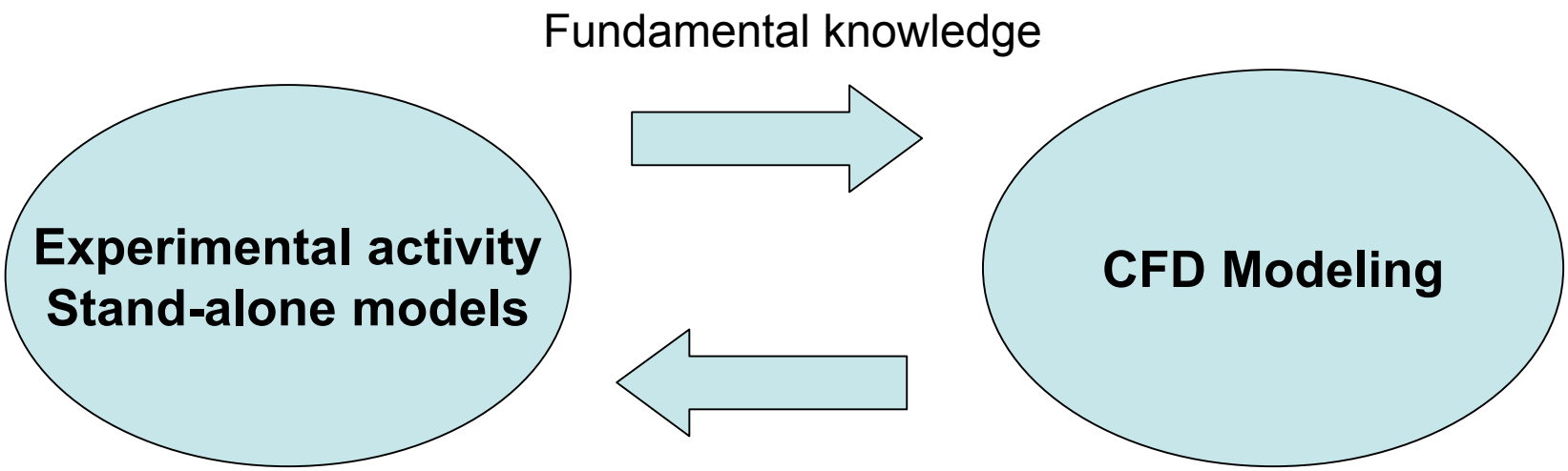
Grid
Concerns: jet modeling, deposit modeling, moving boundaries

Demands, concerns, approaches

Particle tracking
Approach: own submodels
Concerns: particle-particle interactions, numerical accuracy

Computers etc
Concerns: computer capacity always limiting, parallelizing costly

Conclusions



Comprehensive picture,
new research topics

char bed processes

fuel mixtures

pyrolysis rate

opportunity fuels

volatile release

deposition