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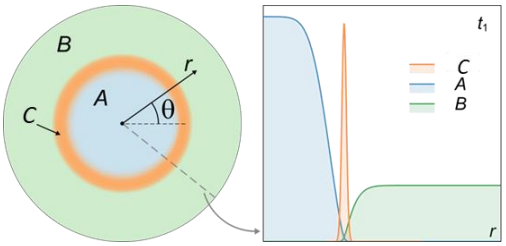
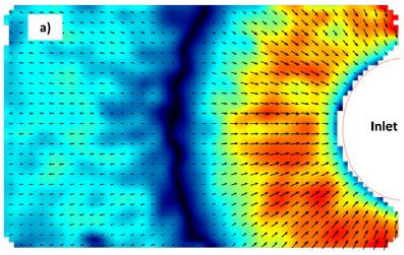
# Numerical simulation of a Reaction-Diffusion-Advection front in a radial geometry reactor (Diploma Thesis)

Chemical reactions fronts and instabilities comprise fields of research that constantly call for new challenges. Present in numerous technological applications (porous media, reactive mass transfer, $CO_2$ capturing) they pose diverse modelling challenges. The intern/diploma student will be asked to numerically (and potentially experimentally) investigate simple Reaction-Diffusion-Advection fronts in radial geometries. The main quest would be to decipher the effect of the geometry and of any density driven effects in high Pe number reactive flows.




The student is expected to:

- Setup numerical simulations employing the Finite-Volume-Method (or other adequate i.e. LBM), no previous experience is necessary but it is highly valued.
- Parameter variation of reactive flow simulations.
- Validate/compare with existing/new experiments.

Requirements:

- Study in process engineering, chemical engineering, mechanical engineering (or related field)
- Basic fluid dynamics and transport phenomena knowledge
- Experience in CFD software is preferred but not obligatory (ANSYS, COMSOL, OpenFOAM or other)
- Motivation, interest in the field, ability to solve problems, good academic track records

Conditions:

- duration min. 6 month, start: Jan/Feb 2022, workplace: TU Dresden

References

[1] Comolli et al. (2021) Phys. Rev. E **104** 044206 doi.org/10.1103/PhysRevE.104.044206
[2] Toth et al. (2020) PCCP **22** 10278-10285 doi.org/10.1039/C9CP06370F

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