Geometry optimization through flow simulation and module design

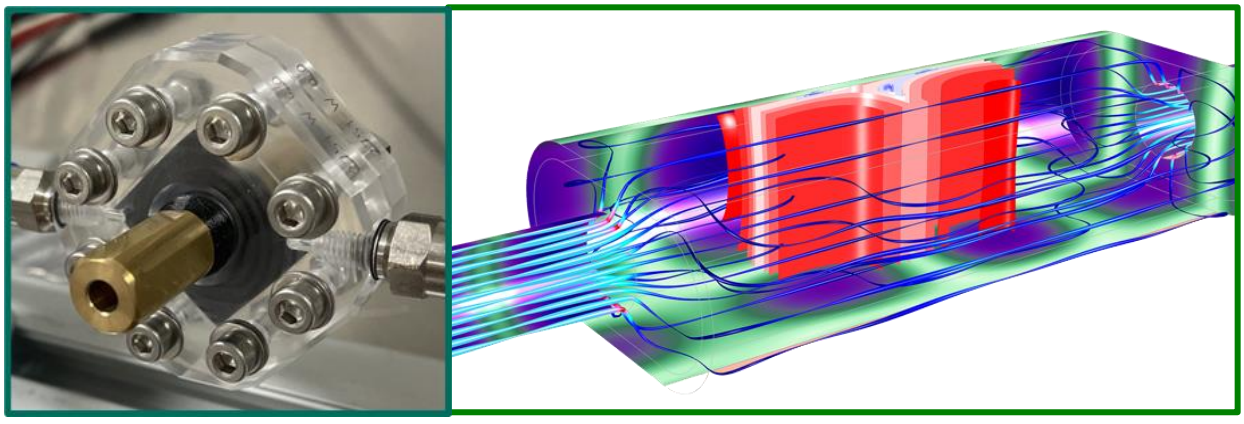
**Background and Motivation:**

The development of sustainable Direct Air Capture technologies is critical to solve the global warming problem as the increasing the amount of emitted carbon dioxide in the atmosphere is one of the main factors for more than half of the global warming variance. Therefore, it became the main target of GHG capture research recently. Thus, fast mitigation of greenhouse gases emissions has been one of the most urgent scientific problems in the global arena over the last decades. To this end, capturing carbon dioxide not only from the point source is important but also the trapped one in the atmosphere is quite urgent and necessary. Direct air capture (DAC) is a carbon dioxide removal technology which separates CO2 directly from the air using an engineered system. As it is known, the concentration of CO2 in air is ultra-diluted which makes this technology be challenging especially in presence of high concentrations of dioxygen and water in air.

My project in IMVT is focused on DAC technology through designing and preparing the module based on Electro-Swing Adsorption method. So the test rig was set up in order to evaluate the module performance.

In order to optimize the geometry of module, simulation should be performed by using related software. Effect of module's design on the module's efficiency is planned to be studied.

This position is aimed at students from the faculties of chemical engineering - KIT.



**Tasks:**

1. based on the experimental data, flow simulation is desired to perform the modules geometry optimization.

2. using Multiphysics simulation to study the performance module in operation and compare the result with the experimental data resulting from optimized module.

**Conditions:**

- Students of chemical engineering / process engineering.
- Language: German or Language

Start: by arrangement

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