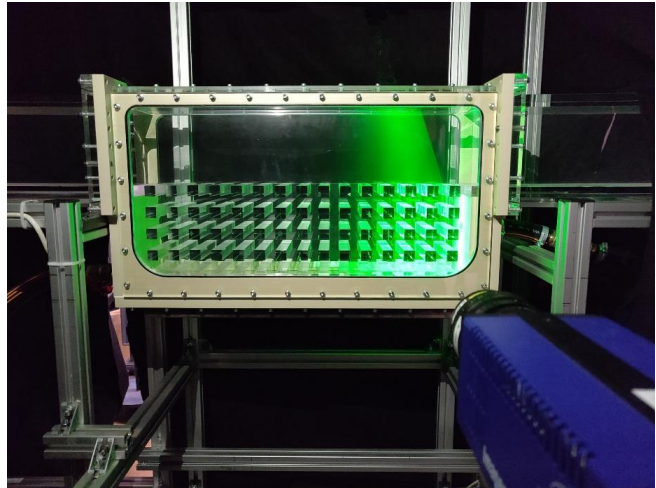


Bachelor-/Masterthesis

Experimental Investigation of a Turbulent Duct Flow Above a Porous Medium

Overview of the topic:

The flow characteristics of the interface region between a porous medium and an adjacent fluid layer in crossflow have received considerable attention in the past years. The topic is of relevance to a variety of engineering applications, ranging from environmental problems to transpiration cooling, where both the porosity of the medium as well as the characteristic pore scale vary from the millimetre to the submicron range. Although for laminar crossflow interactions there is still some controversy, it is clear that porosity affects the slip velocity decay. In turbulent crossflow, instead, it is still not clear how permeability and porosity affect the penetration of energetic turbulent sweeps into lower pores. Understanding the turbulent penetration mechanism into lower pore levels is therefore a great challenge. This requires high spatially and temporally resolved measurements in air, to obtain a realistic representation of turbulence pumping and fluid entrainment. In order to understand the interfacial transport mechanisms, the aim of this thesis is to experimentally investigate the velocity field in the cross flow region using particle image velocimetry (PIV).



Picture of the applied PIV system

Tasks:

- Literature review / Read into topic
- Familiarization with the laser-optical measuring method of PIV
- Detailed velocity measurements of the flow
- Evaluation of the velocity field measurements
- Documentation and discussion of results

Start date:

01.07.2020 (can be discussed)

Contact:

Julian Härter, Room 1-124, Pfaffenwaldring 31
Email: julian.haerter@itlr.uni-stuttgart.de
Tel.: +49 (0) 711 685 62438