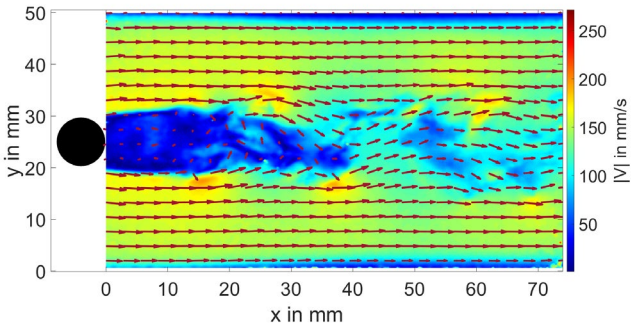
Bachelor-/ Masterarbeit

Velocity measurements of flow with multiple cylinders

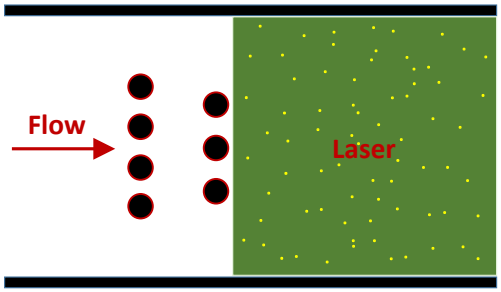
Motivation:

The wake flow behind an array of cylinders has fundamental relevance in fluid dynamics and practical significance in offshore and ocean engineering applications. While the vortex shedding of flow past a single cylinder-Kármán Vortex Street-has been extensively investigated, the comprehensive understanding of the complex structures of the flow with multiple cylinders is still ongoing. Distinct flow structures may emerge depending on the flow speed and the orientation and spacing of the arrangement. Vortex street interaction, quasi-periodic vortex shedding, and suppression of vortex shedding are some examples of possible wake flow patterns of such arrangements. In this regard, measurement of the velocity field can unravel the flow structure behind such configurations and provide promising insights to the complex interaction of the cylinders. Moreover, this data can be used to feed neural networks of machine learning algorithms in order to predict the flow field.

Wake flow behind a cylinder



Flow with multiple cylinders



Left: A sample velocity field of flow behind a cylinder. Right: A schematic of an arrangement of cylinders inside a water channel.

Objective:

The main objective of this thesis is the characterization of the flow behind an arrangement of cylinders inside a water channel. For this purpose, Particle Image Velocimetry (PIV) of the flow in different Reynolds numbers will be performed. Moreover, the variation of the orientation of the cylinders is possible depending on the interest of the student.

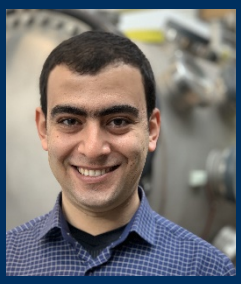
Working Packages:

- Literature review and familiarization with PIV and experimental setup
- Conduction of PIV measurements
- Evaluation of the results and deriving the main conclusions
- Writing and presenting the thesis

Target groups:

Students with interest in research, fluid dynamics, and measurement techniques. The scope of the thesis will be reduced for Bachelor students.

Contact Person:



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