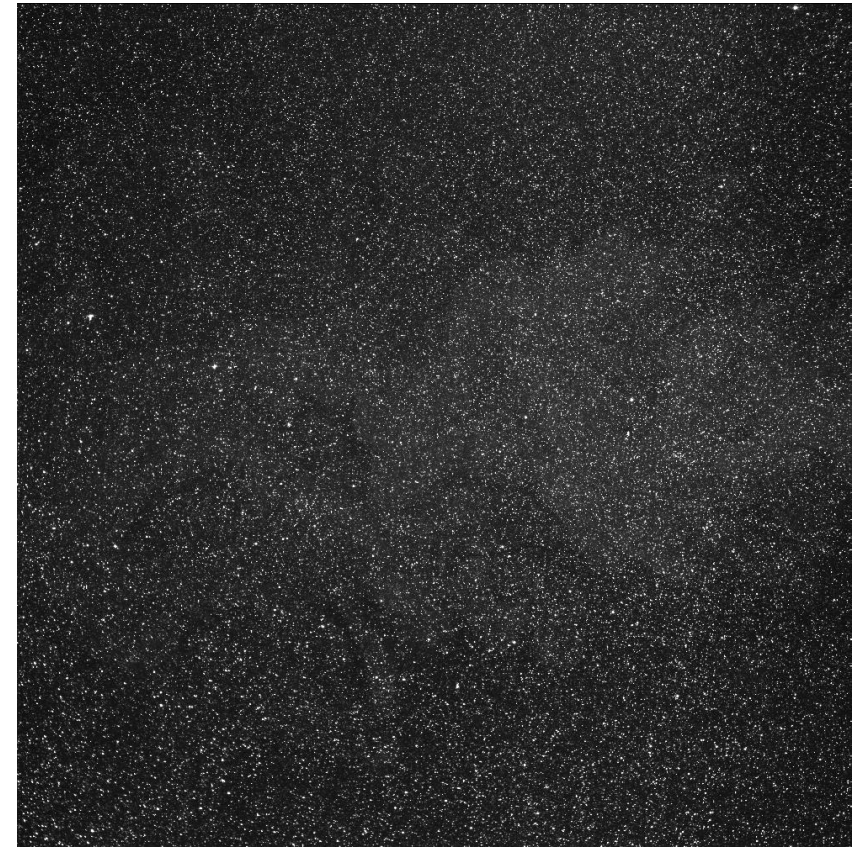


Tutorial Exercise

In this exercise we will perform PIV analysis of a jet flow.

The set of images is the set A available from <http://www.pivchallenge.org/pub03/index.html#a>

From here, you should download a folder containing all the image pairs as in the print screen below



All the technical info on the dataset is discussed in Fukushima,C., Aenen, L., Westerweel, J., Investigation of the mixing process in a axysimmetric turbulent jet using PIV and LIF

Google it and you will find the pdf.

The content of the tutorial

You will receive 5 python files

In the exercise you will mostly interact with these

1_Pre_Processing

2_OpenPIV_windef_client

3_Post_Processing

Which will need these

pyprocess_patch

OpenPIV_windef_func

What should you install:

```
conda install -c conda-forge openpiv
```

For more info, tutorials and updates on this powerful software, visit:

<http://www.openpiv.net/openpiv-python/>

The pre-processing is a simplified version of the background noise removal using a POD based approach (Mendez, 2016)

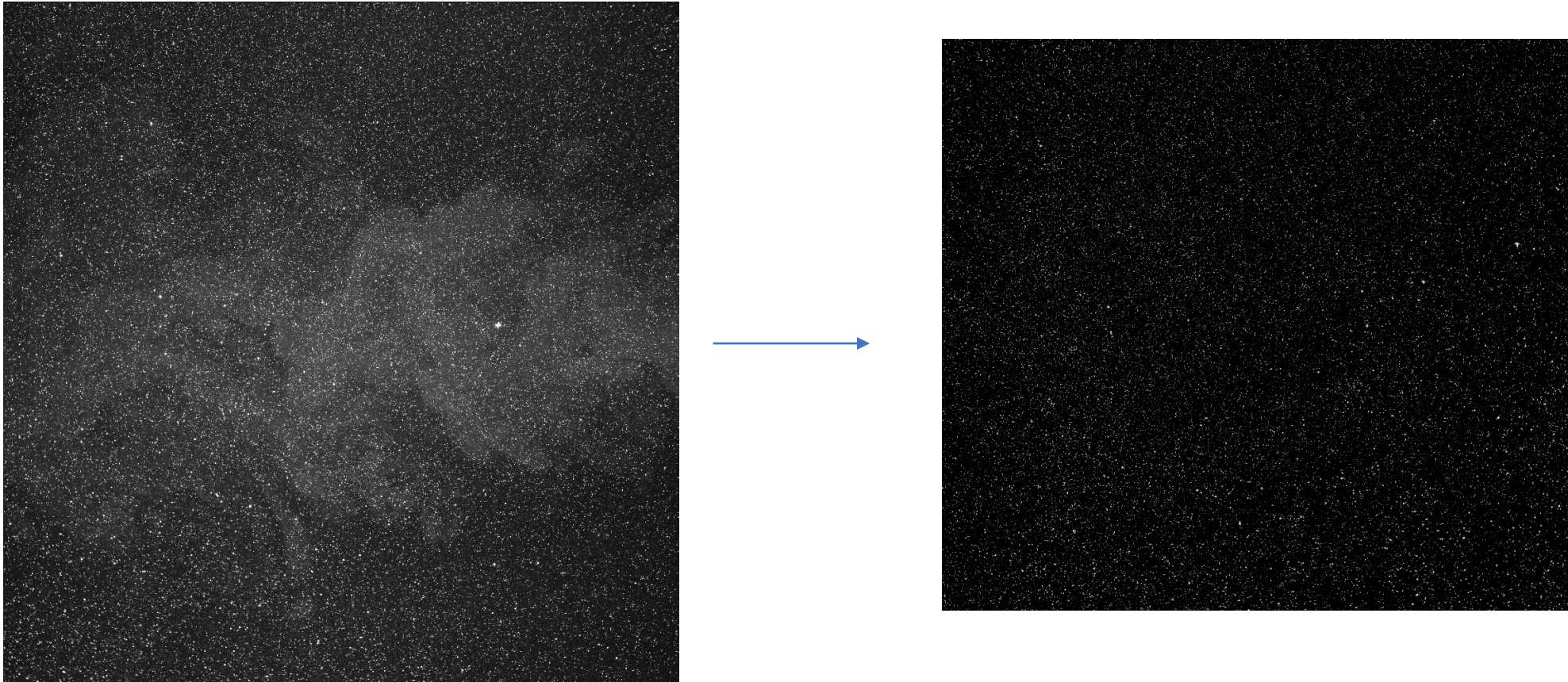
The PIV software is an adaptation of the popular OpenPIV toolbox (from A. Liberzon).

This adaptation was carried out by Theo Käufer during his STP at the von Karman Institute (see his STP report for more details) and it is still under development.

Step 1

Explore the code 1_Pre_Processing. **Observe that now you are not requested to understand all the details of the POD analysis and video decomposition; we will come back to this in the Signal Processing Course.**

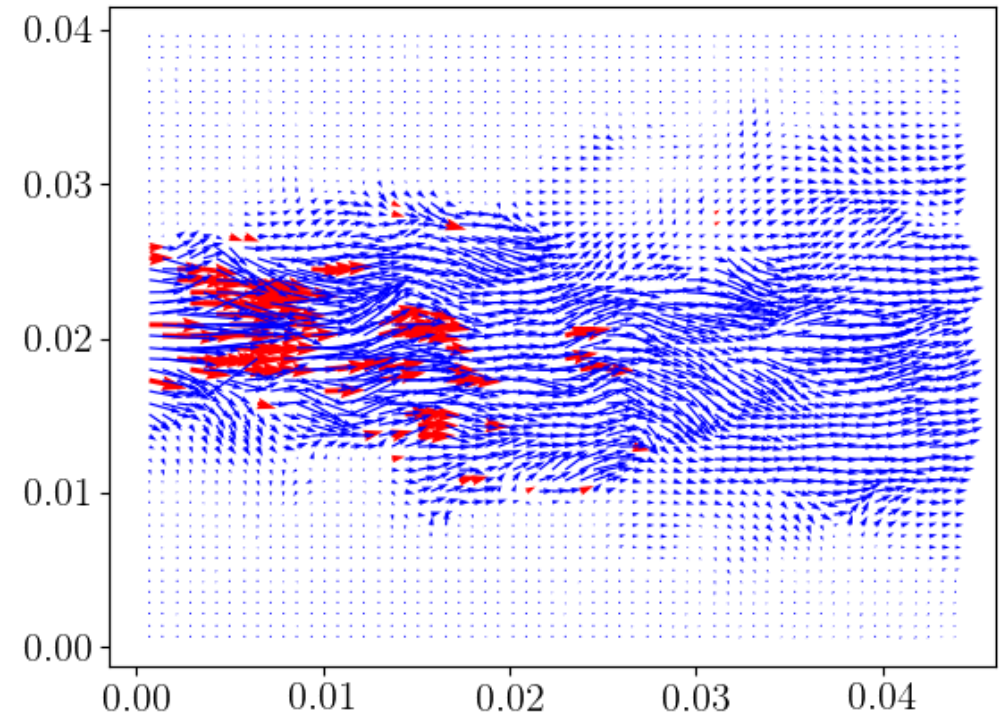
At this step we want to: (1) crop the original images (2) flip them from left to right and (3) remove the background noise



Step 2

Use the file `2_OpenPIV_windef_client`. Open the file `OpenPIV_windef_func` to have an idea of the architecture of the PIV code. Again, you are not expected to understand all the details but see what are the key functions. *Note: this code is under development. You might find some bugs; If you do, you are very lucky: by fixing it you will become a contributor to the software !*

At this step we want to compute the velocity field and export the results in txt format.

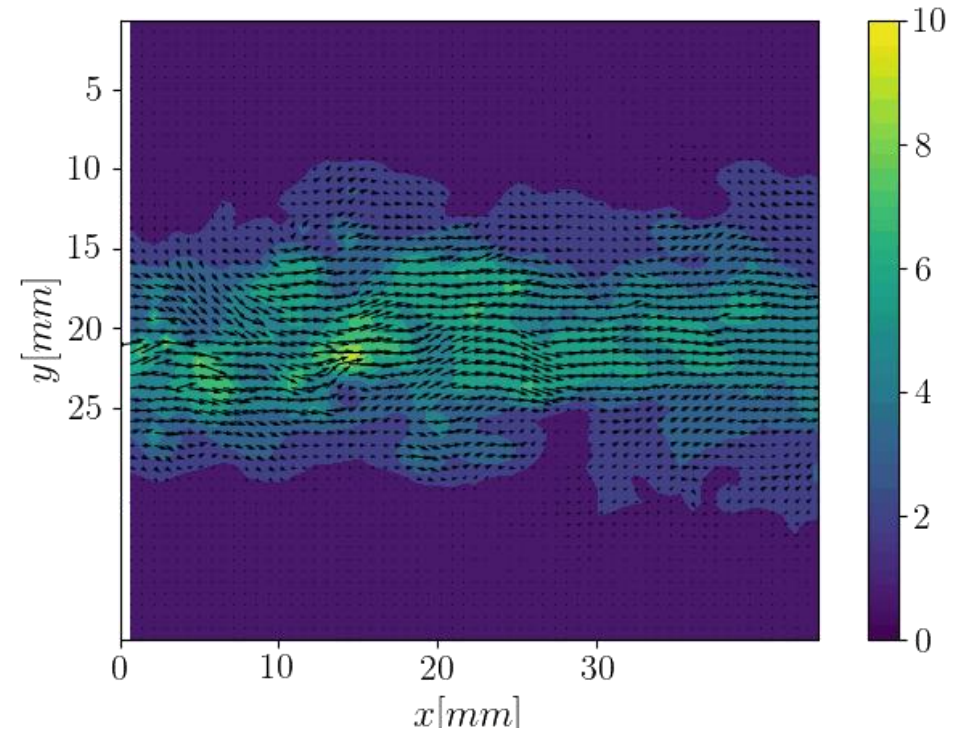
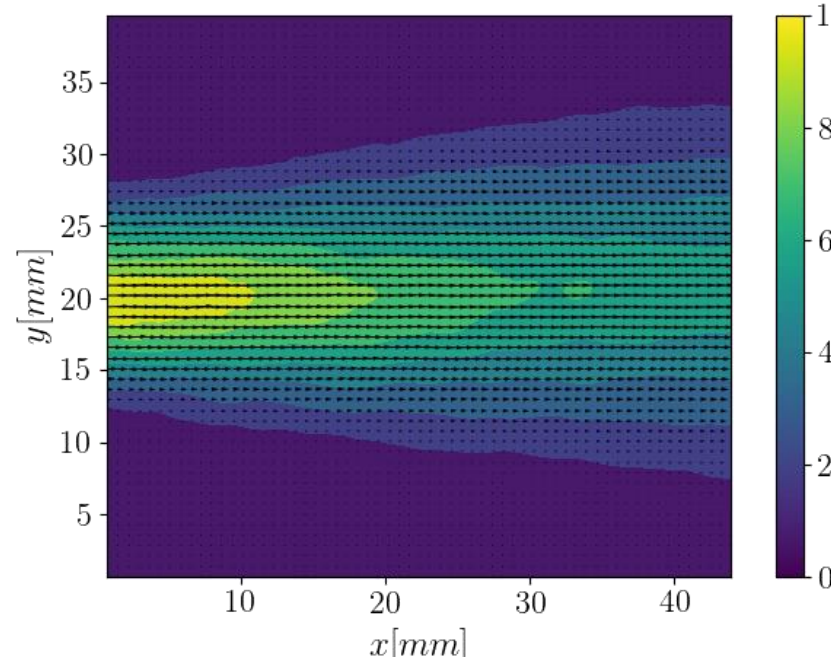


Step 3

Build your own 3_Post_Processing file! You will discover that this file is not enough to complete the task and you must write your own version of it. Use everything you have learned during the course.

We want four things

1. Build an animation of the velocity vector (Right)
2. Extract the Mean Flow (below)



Results

