

PIV-Measurement of self-induced periodic flow

Objective

Conventional

- External triggering of the PIVsystem
- Averaging of all data with identical phase angle

Disadvantages:

- For self-induced flow an external trigger is missing. The phase angle of the shots is initially unknown.
- A statistic evaluation of the PIV shots is not possible

Idee: PIV+ HWA

- Long time recording without triggering: PIV & HWA run parallel
- Each PIV measurement is related to the Hotwire time signal by means of a phase angle
- Ensemble averaging of classified groups of shot

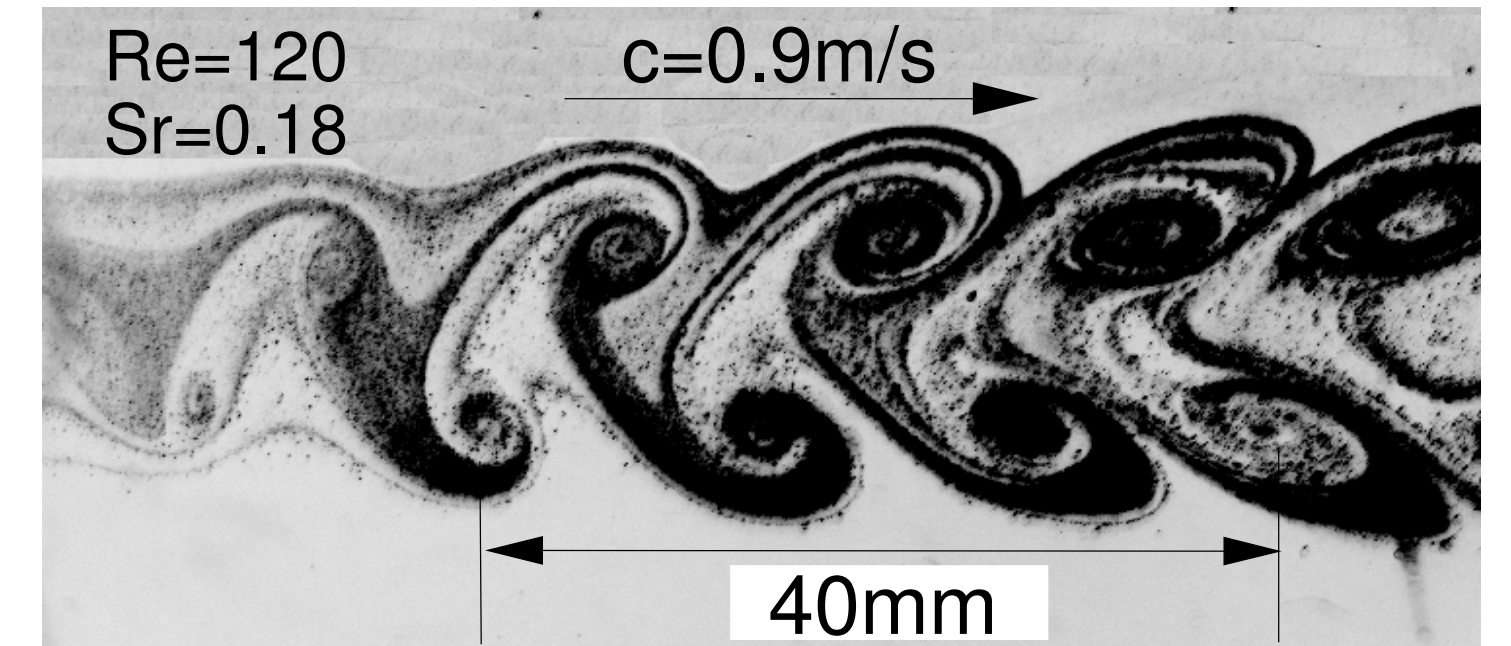
Advantages:

- Prevention of averaging errors
- time resolution of the periodic flow

Application

Measurements of self-induced periodic phenomena with frequencies higher the Acquisition rate of the PIV system

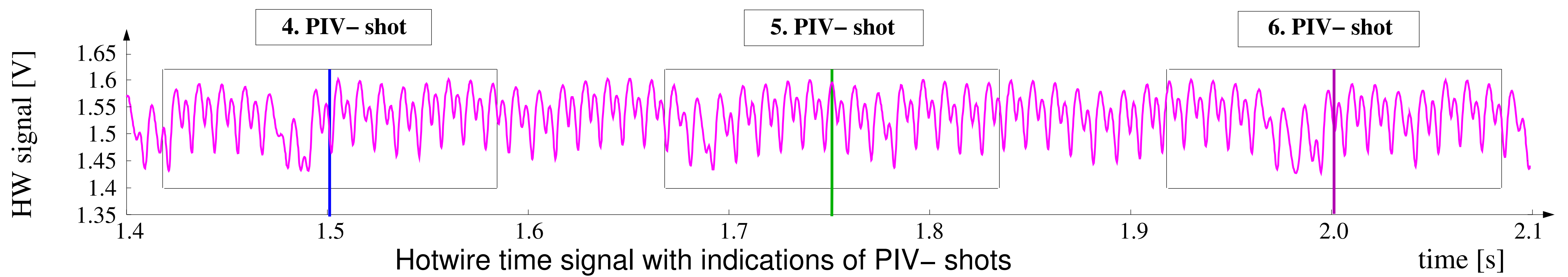
Backlash of a cylinder $d=2\text{mm}$



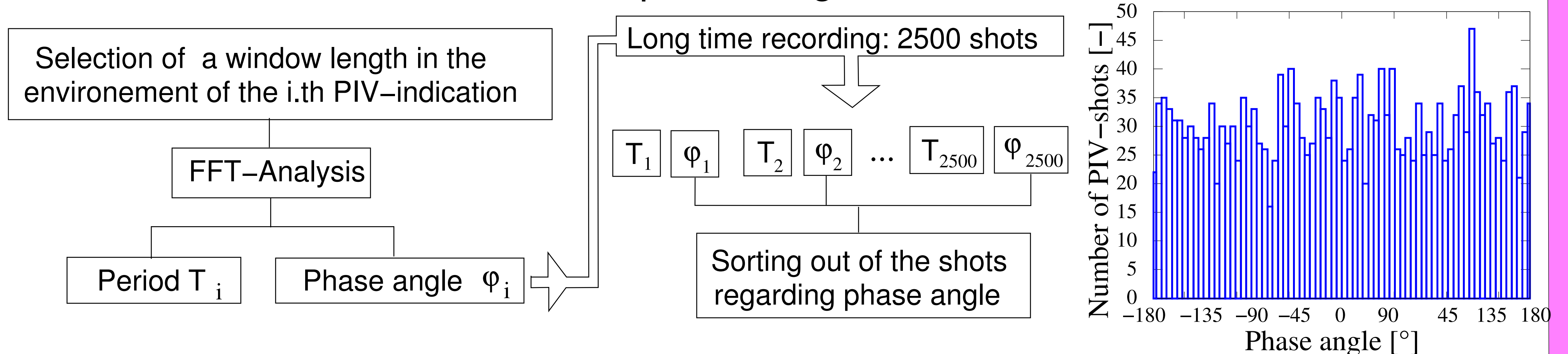
Karman vortex street
Transport of seeding free air in the backlash

Method

Signalprocessing



Allocation of PIV shot with the same phase angle



Results

Velocity field regarding the phase angle $\varphi = 0$ only the periodic part

