

Master thesis physics: Investigation of induced dynamic stall on a rotor blade segment

AG TWiSt – Turbulenz, Windenergie und Stochastik

Your Topic

Understanding the dynamic flow around airfoils and rotor blades is a very recent research problem. The flow itself can be investigated with a variety of measurement methods. A very efficient method is *Particle Image Velocimetry (PIV)*. This method enables a 3D velocity field to be measured with high spatial and temporal resolution by means of images of a flow containing particles.

The main task in your master thesis will be to investigate an airfoil under dynamic inflow. For this purpose, a so-called active grid is used, with which the flow can be modulated arbitrarily. To compare this method with common methods, you will also modify the existing setup so that the airfoil itself can be turned.

The two flow situations, rotating airfoil and dynamic inflow, are to be examined by you afterwards by means of stereo PIV. The focus should be on structure formation on the upper side of the airfoil. Using pressure measurement techniques or high-resolution force sensors, lift forces shall also be determined and compared.

As a long-term goal, these investigations should improve the understanding of dynamic stall and thus contribute to an optimization of wind turbines by reducing dynamic loads.

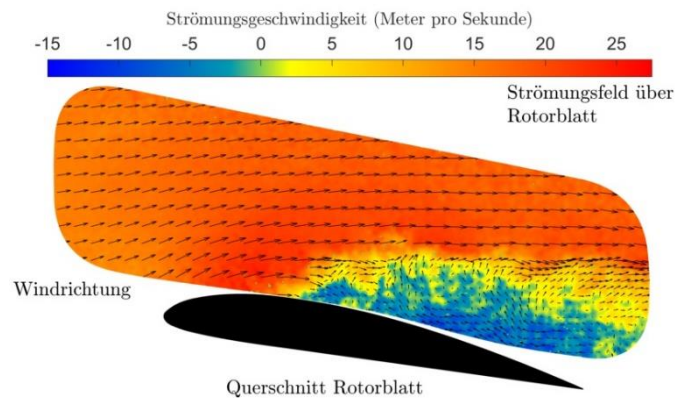


Fig. 1: PIV-measured stall on a wing profile (single image with colored flow velocity)

Your Profile:

You should have completed a bachelor's degree in physics (or similar), be very motivated and have an interest in aerodynamics and optical measurement methods.

Your next step:

- Come for a visit to our labs and get an impression of our pleasant working atmosphere and our research focus.
- Your contact is Tom Wester in the WindLab (room W33-2-226, email tom.wester@uol.de).

More Information:

AG TWiSt: <http://www.uni-oldenburg.de/twist/>
ForWind: <http://www.forwind.de/>