

Kolloquium Thermo- und Fluiddynamik

Data-driven analysis and modelling of unsteady vortex dominated flows

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In my lab, we specialise in the experimental measurements and data-driven analysis of unsteady vortex dominated flow interactions with applications in bio-inspired propulsion, wind turbine rotor blade aerodynamics, and gust interactions. The unsteady flow conditions we are interested in can be the result of temporal changes in the surrounding fluid flow velocity and direction, e.g. due to gusts, wakes, or shear flows; or it can be the result of the unsteady movement of the objects that interact with the flow, e.g. pitching, flapping, or rotating wings and airfoils. The unsteadiness can be a blessing: it allows bumblebees to fly despite having small wings, and creates electrical power by rotating wind turbine rotors; but it can also cause serious damage to the objects subjected to unsteady flow interactions: loss of lift and manoeuvrability, structural vibration and fatigue damage. In this talk, I will present how we use experimental data to unfold the origin and development of unsteady flow separation and vortex formation and how this aids to exploit the benefits and limit the harm caused by unsteady flows.



Date: 08 June 2022
Time: 16:15h
Place: ETH Zurich, Room tbd
Host: Prof. Filippo Coletti, IFD