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The 2d-LCA as an alternative to x-wires JAROSLAW PUCZYLOWSKI, MICHAEL HÖLLING, JOACHIM PEINKE, University Oldenburg — The 2d-Laser Cantilever Anemometer (2d-LCA) is an innovative sensor for two-dimensional velocity measurements in fluids. It uses a micostructured cantilever made of silicon and SU-8 as a sensing element and is capable of performing mesurements with extremly high temporal resolutions up to 150kHz. The size of the cantilever defines its spatial resolution, which is in the order of 150 μm only. Another big feature is a large angular range of 180° in total. The 2d-LCA has been developed as an alternative measurement method to x-wires with the motivation to create a sensor that can operate in areas where the use of hot-wire anemometry is difficult. These areas include measurements in liquids and in near-wall or particle-laden flows. Unlike hot-wires, the resolution power of the 2d-LCA does not decrease with increasing flow velocity, making it particularly suitable for measurements in high speed flows. Comparative measurements with the 2d-LCA and hot-wires have been carried out in order to assess the performance of the new anemometer. The data of both measurement techniques were analyzed using the same stochastic methods including a spectral analysis as well as an inspection of increment statistics and structure functions. Furthermore, key parameters, such as mean values of both velocity components, angles of attack and the characteristic length scales were determined from both data sets. The analysis reveals a great agreement between both anemometers and thus confirms the new approach.

Jaroslaw Puczylowski
University Oldenburg

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