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Drag coefficient measurements of spheres with different surface patterns HENDRIK HEISSELMANN, DANIEL STRUTZ, JOACHIM PEINKE, MICHAEL HOELLING, ForWind - Center for Wind Energy Research, Institute of Physics, University of Oldenburg — Precise drag force measurements of bluff bodies are an under-estimated challenge and in particular drag coefficients of bodies with rough surface structure are not very well documented in literature. In our contribution, we present a new setup for measurements of the acting drag forces on spheres and other bluff bodies. The examined bodies are attached to a slim supporting rod, which is held by thin steel wires in a cubical rigid frame, and the resulting velocity-dependent forces are measured by means of strain gauges. Besides a detailed description of the achieved experimental setup, we will present results from force measurements using smooth spheres and a sphere with a dimpled surface pattern. Measurements were performed for a Reynolds number range of 2,700 up to 230,000 under laminar inflow conditions as well as in turbulent flows generated by classical and fractal grids. An overview of the calculated drag coefficients will be given for different sphere types and for varying turbulence levels. The obtained results will be compared to those documented in literature.

Hendrik Heisselmann
ForWind - Center for Wind Energy Research,
Institute of Physics, University of Oldenburg

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