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Three dimensional flow around a flexible circular cylinder in cross-flow FRANCISCO HUERA-HUARTE, DAVID JEON, MORTEZA GHARIB, California Institute of Technology — The three dimensional flow around a flexible cantilever model undergoing vortex-induced vibrations has been studied by using Defocusing Digital Particle Image Velocimetry (DDPIV). The DDPIV technique allowed the simultaneous measurement of the motion and the flow around a portion of the cylinder. Different circular cylinder models accounted for several high aspect (length over diameter) and low mass ratios (mass over mass of displaced fluid), leading to flow-induced vibrations with different dominant mode shapes and frequencies. The quantitative study of the wake structures of cylinders able to vibrate at different structural modes is of particular interest as there is a lack of published results. Moreover, the mechanisms yielding to mode locked-on behavior and the topology of the wake under this situation are poorly understood.

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