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## Aeroacoustics of a low Mach number tip-gap flow

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A thorough experimental study was performed in several campaigns in the anechoic wind tunnel of the Ecole Centrale de Lyon on a single airfoil at a low Mach number to investigate the tip leakage flow and the associated broadband noise. The influence of the inflow velocity, the airfoil angle of attack and the gap size were characterized and hence an extensive data set was obtained. Both near field aerodynamic and far field acoustic features of this configuration were recorded. Statistical post-processing of the data highlighted some of the governing parameters of this jet-like flow configuration and two different noise generation mechanisms. Some scaling laws were derived from the experimental data which gave also inputs for semi-analytical far field noise prediction models relying on the theory for linearised unsteady aerodynamics around a slender airfoil. The underlying sound generation mechanism is the scattering of the tip clearance flow perturbations by the airfoil trailing edge. The aerodynamic perturbation is described as a gust with a spanwise distribution that is concentrated near the gap region. The models are presented and compared to experimental results and CFD calculations.

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