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Investigation of Gas Turbine Cooling Flows Using Magnetic Resonance Velocimetry[1] WONTAE HWANG, SEUNGCHAN BAEK, SANGJOON LEE, JAEHYUN RYU, Seoul National University — Gas turbine blades are exposed to extreme high temperature, beyond the melting point of the material, thus various methods of advanced cooling are applied. Internal cooling extracts heat from the blade surface via cooling flow within multiple channels inside the blade. These complex channels are spaced tightly together, and it is difficult to perform optical measurements of the flow. To overcome this problem, Magnetic Resonance Velocimetry (MRV) can be utilized to obtain the 3D flow field within these cooling channels. In this study, we demonstrate how we use MRV to analyze the complex flow field within turbine blade cooling structures such as a trailing edge internal channel which has rib turbulators and a thin sharp corner. The data can be used to provide quantitative validation for RANS and LES CFD.

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