Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Fully developed pipe and triangular channel flow measurement using Magnetic Resonance Velocimetry[1] SEUNGCHAN BAEK, WONTAE HWANG, Seoul national University — Magnetic resonance velocimetry (MRV) is a non-intrusive flow visualization method which is able to measure the 3 dimensional 3 component (3D3C) mean velocity field in complex geometries, using a healthcare MRI scanner. Since this technique is based on nuclear magnetic resonance (NMR), it is free from optical distortion and does not require tracer particles. Due to these powerful advantages, MRV usage is gradually expanding from biomedical fields to the engineering domain. In this study, we validate the performance of MRV by measuring fully developed pipe flow and compare measured data with time averaged DNS data. We then investigate the overall flow characteristics in a triangular channel with a sharp corner. At the sharp corner, boundary layer effects dominate and the effect of turbulence is reduced. This information has implications for engineering applications such as flow in a turbine blade internal cooling passage at the sharp trailing edge.

[1]This research was supported by the Seoul National University Research Grant in 2017, and Doosan Heavy Industries Construction. (Contract No. 2016900298 and 2017900095)

SEUNGCHAN BAEK
Seoul national University

Date submitted: 02 Aug 2017 Electronic form version 1.4