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**Magnetic Resonance Velocimetry Measurements of a Three-Dimensional Disturbance in a Laminar Boundary Layer** KE ZHANG, Xi'an Jiaotong University, AHMED NAGUIB, Michigan State University, TIM MICHAELIS, DANIEL FREUDENHAMMER, TU Darmstadt, SVEN GRUNDMANN, University of Rostock — Magnetic Resonance Velocimetry (MRV) is a modern flow diagnostic technique with unique advantages including the ability to efficiently capture volumetric measurements of velocity fields in complex geometry without the need for optical access. In the present work, MRV is employed to provide boundary-layer-resolved measurements of a 3D disturbance created by a roughness element in a laminar boundary layer. Three-component mean-velocity-filed data are captured over a volume of approximately 100 x 100 x 250 $mm^3$ with a voxel size of 1 $mm^3$. The reported measurements are similar to those presented at the APS-DFD meeting last year, after improvement of the acrylic test section of the water-flow loop used in the experiments. The roughness element is mounted through the test-section's side wall where the boundary layer Reynolds number is 162, based on displacement thickness. The experiments are designed to investigate the effect of the roughness element's shape (cylindrical versus hemi-spherical) and height (for the cylindrical element). Details of the 3D velocity and vorticity fields in the disturbed boundary layer will be presented.

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