

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Practical estimation of DPIV uncertainty using pseudo-image pairs**<sup>1</sup> MICHAEL MCPHAIL, MATTHEW WELDON, MICHAEL KRANE, ARNOLD FONTAINE, HOWARD PETRIE, ARL Penn State, JOHN BUCHANAN, Bettis Atomic Power Laboratory, DONALD LORENTZ, Bettis Atomic Power Laboratory, RICHARD BAUER, Bettis Atomic Power Laboratory — While the sources of uncertainty in PIV measurement have long been understood, quantifying the contribution of each source has proved elusive. Here we present a straightforward approach using image pairs formed from a real image and that same image, subject to a uniform non-integer displacement. This procedure thus naturally incorporates contributions of image quality, optical setup, and pixel resolution to uncertainty. The pseudo-image pairs for a range of displacements are used to estimate an ensemble of displacement vectors, which is then used to estimate the bias and random errors in displacement. This method is particularly useful for identifying pixel locking bias. Applications of this approach to both fully-developed turbulent pipe flow and impinging jet flow will be presented.

<sup>1</sup>Acknowledge partial support of NIH 5R01DC005642.

Michael Krane  
ARL Penn State

Date submitted: 10 Aug 2011

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