

Abstract Submitted
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Cross-correlation PIV using infrared and visible Nd:YAG pulses and a Nikon dSLR MICHAEL HALLBERG, PAUL STRYKOWSKI, University of Minnesota — A cross-correlation particle image velocimeter is assembled using two Nd:YAG lasers and a Nikon D70 SLR camera. One laser is frequency doubled while the other is not thereby producing a pulse train of two separate colors, green and IR respectively. The internal IR filter is removed from the Nikon D70 and the resulting CCD is sensitive over a range through the visible and into the IR (up to at least 1064nm). Each image was then exposed to both laser pulses revealing two distinct particle images, one green and the other red. The doubly exposed images were separated into two images corresponding to the green channel and the red channel thereby allowing cross-correlation. Initially, the correlation was contaminated by the color filter used to produce the RGB colors on a single CCD, generating a large zero displacement peak. Image processing was employed to reduce the zero peak; the next highest peak generally yielded the particle displacements. Camera manufacturers are developing technologies that will supplant the current color filter (cf. Sigma's image sensor), hopefully making the dSLR a viable option for PIV going forward.

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