

Abstract Submitted
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Development of a low-cost multiple diode PIV laser for high-speed flow visualization¹ RAJ BHAKTA, MICHAEL HARGATHER, New Mexico Tech — Particle imaging velocimetry (PIV) is an optical visualization technique that typically incorporates a single high-powered laser to illuminate seeded particles in a fluid flow. Standard PIV lasers are extremely costly and have low frequencies that severely limit its capability in high speed, time-resolved imaging. The development of a multiple diode laser system consisting of continuous lasers allows for flexible high-speed imaging with a wider range of test parameters. The developed laser system was fabricated with off-the-shelf parts for approximately \$500. A series of experimental tests were conducted to compare the laser apparatus to a standard Nd:YAG double-pulsed PIV laser. Steady and unsteady flows were processed to compare the two systems and validate the accuracy of the multiple laser design. PIV results indicate good correlation between the two laser systems and verifies the construction of a precise laser instrument. The key technical obstacle to this approach was laser calibration and positioning which will be discussed.

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