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Flow Imaging Using Femtosecond Laser Induced Two-Photon Fluorescence

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A novel technique is demonstrated for the imaging of turbulent flows in which a single window to the flow is the only optical access required. A femtosecond laser is used to excite two-photon fluorescence in a disodium fluorescein-seeded water jet. The fluorescence signal is generated only at the focal point of the laser due to the highly non-linear nature of the two-photon absorption and is collected in a direction counter-propagating to the excitation beam. Tight focusing of the laser is used to limit the probe volume and the two dimensional mean and RMS concentration images are collected by raster scanning the laser.

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