

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Multi-photon Molecular Tagging Thermometry with Femtosecond Excitation (FemtoMTT)¹ SHAHRAM POUYA, Michigan State University, ALEXANDER VAN RHIJN, NTS Optical B.V., ALIREZA SAFARIPOUR, MARCOS DANTUS, MANOOCHEHR KOOCHESFAHANI, Michigan State University — Following our earlier report of first Molecular Tagging Velocimetry (MTV) measurement under nonlinear resonant femtosecond excitation in an aqueous flow, we present results of Molecular Tagging Thermometry (MTT) in a simple jet flow using femtosecond excitation. The two-photon absorption process of a phosphorescent supramolecule allows for simultaneous velocity and temperature measurement using a pair of images obtained during the lifetime of the tracer. Results reproduce the tracer temperature response under typical single photon excitation, while providing potential for high rep-rate capabilities for simultaneous velocimetry and thermometry in aqueous flows and eliminating the need for short wavelength UV excitation source and UV optical access in flow facilities.

¹This work was supported by the Air Force Office of Scientific Research, Grant number FA9550-13-1-0034

Shahram Pouya
Michigan State University

Date submitted: 01 Aug 2015

Electronic form version 1.4