Abstract Submitted
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Optimization of Chemical Concentrations for Molecular Tagging Velocimetry[1] WYATT SPELLMAN, DOUGLAS BOHL, Clarkson University — Molecular Tagging Velocimetry (MTV) is a whole field optical diagnostic technique where long lived chemical tracers are mixed on a molecular level with the working fluid. The chemical tracer is excited into phosphorescence using a light source, typically a pulsed UV laser. Because MTV is an absorption/emission technique, versus PIV which is a scattering technique, the light levels can be an order of magnitude lower than that for PIV. It is therefore important to optimize the individual chemical concentrations to maximize the emission in the desired field of view. Three chemicals are used in combination to create the molecular tracer in water. As with all absorption techniques, the intensity of the emitted light is a function of the depth of penetration (i.e. the distance the light beam travels through the fluid medium) due to attenuation of the beam. Attenuation is a function of the tracer concentration, which for MTV is a complicated due to the use of three chemical to create the tracer chemical. In this work we investigate the effect of chemical concentration on the attenuation in order to optimize the mixture so that the emission levels are maximized at any specified depth in the fluid.

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Douglas Bohl
Clarkson University

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