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**Expanding the applicability of multi-photon fluorescence recovery after photobleaching *in vivo* by incorporating convective flow into the recovery model**[1] KELLEY SULLIVAN, University of Rochester Department of Physics and Astronomy, WILLIAM SIPPRELL, University of Rochester Department of Biomedical Engineering, EDWARD BROWN, JR., Manhattan College Department of Physics, EDWARD BROWN, III, University of Rochester Department of Biomedical Engineering — Multi-photon fluorescence recovery after photobleaching is a well-established microscopy technique used to study diffusion, with expanding applications *in vivo*. We present a new model of fluorescence recovery that explicitly includes the effect of convective flows within a system, thereby improving the efficacy of the technique *in vivo*, where convective flows are omnipresent. We test this "flow" model through both simulations and *in vitro* experimentation, and demonstrate the effectiveness of the new model *in vivo*. Our results show that the flow model significantly improves the capabilities of multi-photon fluorescence recovery after photobleaching *in vivo*, by enabling an accurate determination of the diffusion coefficient, even when significant flows are present.

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