

Abstract Submitted
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Glowing Droplets in Turbulence¹ HUMBERTO BOCANEGRA EVANS, Eindhoven University of Technology, THANJA LAMBERTS, Radboud University Nijmegen, NICO DAM, WILLEM VAN DE WATER, Eindhoven University of Technology, JM BURGERSCENTRUM COLLABORATION — Preferential concentration is a process in which turbulence unmixes a dispersion of droplets. It is most prominent at the smallest length and time scales. We select droplets by phosphorescence tagging in a zero mean flow turbulence experiment. The droplets are made out of a Europium-based solution, which has a phosphorescent lifetime of approximately 1 ms. A cylinder-shaped cloud is tagged in a weakly focused laser beam. The evolution of the cloud in the turbulent flow is recorded using an intensified high-speed camera. Through this method both, the advection of the tagged region and the evolution of the droplet concentration, can be monitored. The phosphorescent cloud is subjected to a turbulent flow by means of eight synthetic jets placed on the truncated corners of a cubic chamber. The turbulent flow is highly isotropic and has $Re_\lambda=444$, with Kolmogorov length- and timescale $\eta=79 \mu\text{m}$ and $\tau_k=406 \mu\text{s}$, respectively. We will present a proof of principle of this novel technique.

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