



## Pair Dispersion in Turbulence

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Turbulent mixing of liquids and gasses is ubiquitous in nature. It determines for instance the spread of aerosols or bioagents in the atmosphere and oceans. A fundamental component of turbulent mixing is the separation of two nearby fluid elements (relative dispersion). Local concentration fluctuations, are intimately tied to the problem of the separation of pairs of fluid elements. Despite almost eighty years of intense scientific inquiry, no clear understanding of this fundamental aspect of turbulence has emerged. We report measurements of relative dispersion in a high Reynolds number water flow using 3D optical particle tracking. We find excellent agreement with Batchelor's theoretical predictions, and do not see a fully developed Richardson law. Our results indicate that the initial separation of particle pairs is an important parameter for calculating dispersion in most flows on Earth.