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Multi-scale laminar flows with turbulent-like properties LIONEL ROSSI, JOHN CHRISTOS VASSILICOS, YANNIS HARDALUPAS, Imperial College London — By applying fractal electromagnetic force fields on a thin layer of brine, we generate steady quasi-two-dimensional laminar flows with multi-scale stagnation point topology. This topology is shown to control the evolution of pair separation (Δ) statistics by imposing a turbulent-like locality based on the sizes and strain rates of hyperbolic stagnation points when the flows are fast enough, in which case $< \Delta^2 > \sim t^\gamma$ (whether t stands for time) is a good approximation with γ close to 3. Spatially multi-scale laminar flows with turbulent-like spectral and stirring properties are a new concept with potential applications in efficient and micro-fluidic mixing.

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