

A NOTE ON DIFFUSIONS IN COMPRESSIBLE ENVIRONMENTS

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Abstract: We study the equation of a motion of a passive tracer in a time-independent turbulent flow in a medium with a positive molecular diffusivity. In [6] the authors have shown the existence of an invariant probability measure for the Lagrangian velocity process. This measure is absolutely continuous with respect to the underlying physical probability for the Eulerian flow. As a result the existence of the Stokes drift has been proved. The results of [6] were derived under some technical condition on the statistics of the Eulerian velocity field. This condition was crucial in the proof in [6]. However, in applications it is difficult to check whether the velocity field satisfies this condition.

In this note we show that the main result of [6] can be stated also without the above-mentioned technical assumption. A somewhat similar result, but for time-dependent flows with different statistical properties, has been shown in [5].

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