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The interference of two passive scalars in a homogeneous isotropic turbulent field. (English)

Zbl 0673.76060

J. Fluid Mech. 203, 273-287 (1989).

Summary: We study the interference of two scalars diffusing in homogeneous isotropic turbulence. We use the method described by the authors in J. Comput. Phys. 79, No.2, 317-335 (1988; Zbl 0656.76053) to calculate the cross-correlation coefficient ρ between the concentration fluctuations of two sources. The dependence of ρ on the source separation, shapes and sizes, and its time evolution is calculated for different points in space. Results for the case of two line sources are compared with data from wind tunnel experiments, and seen to be in good agreement. At the centreline ρ is shown to increase as overlap of the two plumes increases. ρ may be either negative or positive depending on the separation between the two sources.

MSC:

76F05 Isotropic turbulence; homogeneous turbulence

76M99 Basic methods in fluid mechanics

Cited in 1 Document

Keywords:

cross-correlation coefficient; source separation; wind tunnel

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