涡度拟能传输惯性区二维湍流标量场方差谱

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摘要　　本文应用非平衡统计力学封闭方法, 给出涡度拟能传输惯性区二维湍流标量场方差谱的完整表达式, 数值计算该表达式中的比例系数B。由于传输过程的非局部性, B依赖于表征波数变化范围的局部化因子, 不再是普适常数。

关键词　　湍流　湍流谱　湍流统计理论

分类号

SCALAR VARIANCE SPECTRUM IN ENSTROPHY CASCADE RANGE OF 2-D TURBULENCE

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Abstract

The nonequilibrium statistical-mechanics theory of a passive scalar field convected by turbulence is applied to study the variance spectrum G(k) of a 2-D (two-dimensional) turbulent passive scalar field in the convective range, while the velocity spectrum $E(k)= cX2/3k-3$ in the enstrophy cascade range, here X is the enstrophy dissipation rate, C is a dimensionless coefficient. The closure equations in this case are divergent due to the nonlocalness of the cascade process in 2-D turbulence. In order to overco...

Key words　　turbulence　turbulence spectrum　statistical theory of turbulence

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