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**Estimation of turbulent space-time energy spectra using local wave-number intervals** GUOWEI HE, TING WU, Institute of Mechanics, Chinese Academy of Sciences — Space-time energy spectra describe the energy distributions over spatial and temporal scales in turbulent flows. However, the estimation of space-time energy spectra from partially resolved velocity fields remains a great challenge. In this paper, we propose a local wave-number interval (LWI) method to estimate space-time energy spectra. This method can accurately predict the first and second moments of energy spectra, where the first moment can be used to calculate turbulent convection velocity and the second moment can be used to measure turbulent spectral broadening. We first show that both phase velocity and amplitude modulation make the significant contributions to spectral bandwidths. Therefore, the local wave-number method that only utilizes the phase velocity is insufficient to determine spectral bandwidths. We further develop the LWI method than includes the contributions of both phase velocity and amplitude modulation to spectra bandwidths. Finally, we use the existing DNS data of turbulent channel flows to validate the LWI method, which accurately predicts spectral bandwidths.

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