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**Coherent structures in turbulent jets: linear models and comparison with experimental data**

Large-scale coherent structures have been observed in turbulent jets for some decades. Their behaviour has been modelled using linear stability analysis of the jet mean flow, and models predict the appearance of a hydrodynamic wavepacket, due to spatial amplification, saturation and decay of Kelvin-Helmholtz wavepackets. However, early comparisons between stability results and experiments were often of qualitative nature, due to the intrinsic difficulty of isolating wavepackets amidst a turbulent flow. This talk reviews linear analysis for turbulent flows, focusing on more recent developments, where coherent turbulent structures are modelled as the most amplified flow response to non-linear excitation via resolvent analysis. Spectral proper orthogonal decomposition (SPOD) appears as the natural approach to obtain coherent structures from spatio-temporal data from experiment or simulation; such structures can in turn be quantitatively compared to the most amplified responses from resolvent analysis. The approach is exemplified by comparisons between theoretical and experimental wavepackets in turbulent subsonic jets. Moreover, the same linear methods are used for the analysis of recently discovered phenomena within turbulent jets: acoustic modes trapped in the potential core, and large-scale streaks.