Temporal decorrelations in compressible isotropic turbulence
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Academy of Science — Temporal decorrelations in compressible isotropic turbulence
are studied using the space-time correlation theory and direct numerical simulation.
A swept-wave model is developed for dilatational components while the classic random
sweeping model is proposed for solenoidal components. The swept-wave model
shows that the temporal decorrelations in dilatational fluctuations are dominated
by two physical processes: random sweeping and wave propagation. These models
are supported by the direct numerical simulation of compressible isotropic turbulence, in the sense of that all curves of normalized time correlations for different
wavenumbers collapse into a single one using the normalized time separations.

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