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**Origin and implications of odd-spin contributions in rapidly distorted turbulence** SUSAN KURIEN, Los Alamos National Laboratory, TIMOTHY CLARK, University of New Mexico, ROBERT RUBINSTEIN, Retired — We present mathematical calculations and supporting data from numerical simulations to demonstrate the emergence of reflexion-symmetry breaking along the polar axis in flows, in the rapid distortion limit. The mathematical decomposition of second-rank tensors (eg. velocity correlations in wavenumber space) is done in the SO3 basis. We show the appearance of symmetry breaking for various reflexion-symmetric initial conditions including isotropic and axisymmetric turbulence. The strain-rate tensor used to achieve rapid distortion also remains symmetric in all our test cases. These results help to elucidate the mechanism by which the so-called odd-spin (reflexion-symmetry breaking) terms arise in the SO3; they also clarify the separate role of this type of symmetry breaking from other explicitly reflexion-symmetric forcings such as helical or rotational strains.

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