

Abstract Submitted
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A Study of Structures with Intense Vorticity in Isotropic Turbulence ANTHONY LEONARD, California Institute of Technology — We study the characteristics of vortex structures having vorticity occupying the high amplitude tail of the distribution of vorticity amplitudes in homogeneous, isotropic turbulence. The data are obtained from the results of a 1024^3 DNS at $Re_\lambda = 433$ residing in the Johns Hopkins web-based public database (<http://turbulence.pha.jhu.edu>). The power law for the observed tail implies a certain average local structure for those regions containing intense vorticity. To obtain a global structure satisfy the solenoidal condition for the vorticity field we add the gradient of a vorticity potential computed using the above-mentioned local structure. Then by assuming that the full vorticity field results from a Poisson distribution in space of these global structures, we can then compute the full PDF of vorticity amplitudes employing techniques used to find the (Holtmark) distribution of gravitational forces acting on a star due to neighboring stars (see, e.g., S. Chandrasekar, 1943, *Rev. Mod. Phys.* **15**, 1-89). The computed full PDF agrees very well with the observed PDF derived from the DNS data.

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