Abstract Submitted
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Bridging the Gap Between Stationary Homogeneous Isotropic Turbulence and Quantum Mechanics[1] SIAVASH SOHRAB, Northwestern University — A statistical theory of stationary isotropic turbulence [1] is presented with eddies possessing Gaussian velocity distribution, Maxwell-Boltzmann speed distribution in harmony with perceptions of Heisenberg [2], and Planck energy distribution in harmony with perceptions of Chandrasekhar[3] and in agreement with experimental observations of Van Atta and Chen (*J. Fluid Mech.* 34 (3) 497-515, 1968). Defining the action $S = -m\Phi$ in terms of velocity potential of atomic motion, scale-invariant Schrödinger equation is derived[1] from invariant Bernoulli equation. Thus, the gap between the problems of turbulence and quantum mechanics is closed through connections between Cauchy-Euler-Bernoulli equations of hydrodynamics, Hamilton-Jacobi equation of classical mechanics, and finally Schrödinger equation of quantum mechanics. Transitions of particle (molecular cluster c_{ji}) from a small rapidly-oscillating eddy e_j (high-energy level-j) to a large slowly-oscillating eddy e_i (low energy-level-i) leads to emission of a sub-particle (molecule m_{ji}) that carries away the excess energy $\varepsilon_{ji} = h(\nu_j - \nu_i)$ in harmony with Bohr theory of atomic spectra. \\ [1] Sohrab, S. H., *Chaotic Modeling and Simulation* (CMSIM) **3**, 231-245 (2016). [2] Heisenberg, W., *Proc. Roy. Soc.* A **159**, 402-406 (1948). [3] Chandrasekhar, S., *Stochastic, Statistical, and Hydrodynamic Problems in Physics and Astronomy*, Selected Papers, vol.3, University of Chicago Press, Chicago, 515-528, 1989.

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