Abstract Submitted
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Turbulent Damping without Eddy Viscosity SIMON THALABARD, Umass Amherst — The intrinsic Non-Gaussianity of turbulence may explain why the standard Quasi-Normal cumulant discard closures can fail dramatically, an example being the development of negative energy spectra in Millionshtchikov's 1941 Quasi-Normal (QN) theory. While Orszag's 1977 EDQNM provides an ingenious patch to the issue, the reason why QN fails so badly is not so clear. Is it because of the Gaussian Ansatz itself? Or rather its inconsistent use? The purpose of the talk is to argue in favor of the latter option, using the lights of a new "optimal closure" recently exposed by [Turkington,2013], which allows Gaussians to be used consistently with an intrinsic damping. The key to this apparent paradox lies in a clear distinction between the ensemble averages and their proxies, most easily grasped provided one uses the Liouville equation rather than the cumulant hierarchy as a starting point. Schematically said, closure is achieved by minimizing a lack-of-fit residual, that retains the intrinsic features of the dynamics. For the sake of clarity, I will discuss the optimal closure on a problem where it can be entirely implemented and compared to DNS: the relaxation of an arbitrarily far from equilibrium energy shell towards the Gibbs equilibrium for truncated Euler dynamics.

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