

KOLMOGOROV, ONSAGER AND A DYADIC MODEL FOR TURBULENCE

BASIL NICOLAENKO MEMORIAL
DISTINGUISHED LECTURE

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4:30PM AZ/MST Virtual via Zoom

We will briefly review Kolmogorov's (41) theory of homogeneous turbulence and Onsager's (49) conjecture that in 3-dimensional turbulent flows energy dissipation might exist even in the limit of vanishing viscosity.

Although over the past 70 years there is a vast body of literature related to this subject, at present there is no rigorous mathematical proof that the solutions to the Navier-Stokes equations yield Kolmogorov's laws. For this reason various models have been introduced that are more tractable but capture some of the essential features of the Navier-Stokes equations themselves. We will discuss one such dyadic model for turbulent energy cascades. We will describe how results can be used to prove this dyadic model is consistent with Kolmogorov's theory and Onsager's conjecture.

Aspects of the work are joint with Alexey Cheskidov, Nathan Glatt-Holtz, Roman Shvydkoy, and Vlad Vicol.

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