

Ritt Lectures

Professor László Székelyhidi Jr.

THE H-PRINCIPLE IN FLUID DYNAMICS

ABSTRACT

It is known since the pioneering work of V. Scheffer and A. Shnirelman in the 1990s that weak solutions of the incompressible Euler equations behave in very unexpected ways. Such solutions are highly non-unique and have several unphysical features such as arbitrary growth of energy. Nevertheless, weak solutions in three space dimensions have been studied in connection with a conjecture of L. Onsager from 1949 concerning anomalous dissipation and, more generally, because of their possible relevance to Kolmogorov's K41 theory of turbulence.

In a series of joint publications with Camillo De Lellis we established a connection between the theory of weak solutions of the Euler equations and the Nash-Kuiper theorem on rough isometric immersions. Through this connection one can interpret the wild behaviour of weak solutions of the Euler equations as an instance of Gromov's celebrated h-principle. In these lectures I will explain this connection, outline the most recent progress concerning Onsager's conjecture and discuss some future directions.

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Room 520 4:30 PM

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