



报告题目: The role of molecules in fluid dynamics

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Abstract:

Fluids are made of molecules, but who cares ? Their properties are hidden in the transport coefficients of the Navier Stokes equation. This equation describes all fluid flow, including the turbulent winds in the earth atmosphere. I will discuss two experiments where molecules matter. In the first we create new molecules in the focus of a strong UV laser so that we can use them as faithful tracers of turbulent flow. It made us realize that the motion of molecules is not flow, as they have a life of their own. The second experiment involves a satellite that uses a laser beam to scatter off the molecules of the atmosphere for measuring the velocity of the winds on earth. Again, we are using molecules as flow tracers. These molecules made us aware of a property of the Navier Stokes equation that we often forget.

Biography:

Willem van de Water obtained a masters degree (cum laude) in physics from the Eindhoven University of Technology. He obtained his PhD degree (cum laude) from Utrecht University where he did experimental and theoretical research on correlation effects in electron-atom collisions. He was Postdoc at Yale University in New Haven (U.S.) and at the State University of New York at Stony Brook, working on the dynamics of highly excited atoms in strong radiation fields.

In 1983 he moved to Philips Research Laboratories in Eindhoven where he did experimental research on gas discharges for the lighting industry. Since 1985 he has been at the Eindhoven University of Technology. As a member of the fluid dynamics group he does research on soft condensed matter, nonlinear dynamics and turbulence. From 1999-2010 he held a part-time chair Radboud University in Nijmegen, developing laser diagnostic tools for strongly turbulent flows in air. He currently has a part-time chair at TUDelft, Laboratory for Aero & Hydrodynamics.

Since 2010 he is member of the outreach team of the Department of Applied Physics of TU/e, and is responsible for many activities reaching out to high school students and their teachers, and to the general public. Part of this is a course on electromagnetism for high-school teachers.



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