Universität Bremen

CENTER OF
APPLIED SPACE TECHNOLOGY
AND MICROGRAVITY
ZARM

Fluid Dynamics Seminar

Date: Wednesday, December 14th 2016 at 13:00
Location: ZARM, Room 1730

Transport of fluid in pipes

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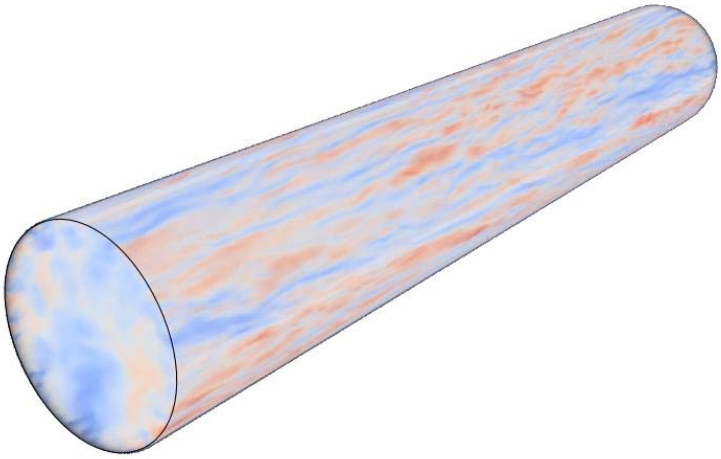

Contours of streamwise velocity fluctuations in a fully turbulent pipe flow at Re=15000.

Pipe flow is one of the most common forms of fluid transport. Despite the simple geometry, the flow in a pipe can exhibit rich complex dynamics depending on the operating condition. At low speed the flow tends to be smooth and regular, which is called laminar flow. As the flow speed is sufficiently high, the large inertia outweighs the stabilizing effect of the viscosity and the flow tends to become turbulent. This change of the dynamics causes an abrupt increase in the friction drag on the pipe wall and higher energy required to pump the fluid. For example, in big pipelines, a fully turbulent flow can cause 100 times larger friction than if the flow were laminar. Therefore, strategies for drag reduction are highly demanded for an energy-efficient society. In this talk, I will present some recent development in the understanding of the transition to turbulence and some strategies for drag reduction for fluid transport in pipelines.