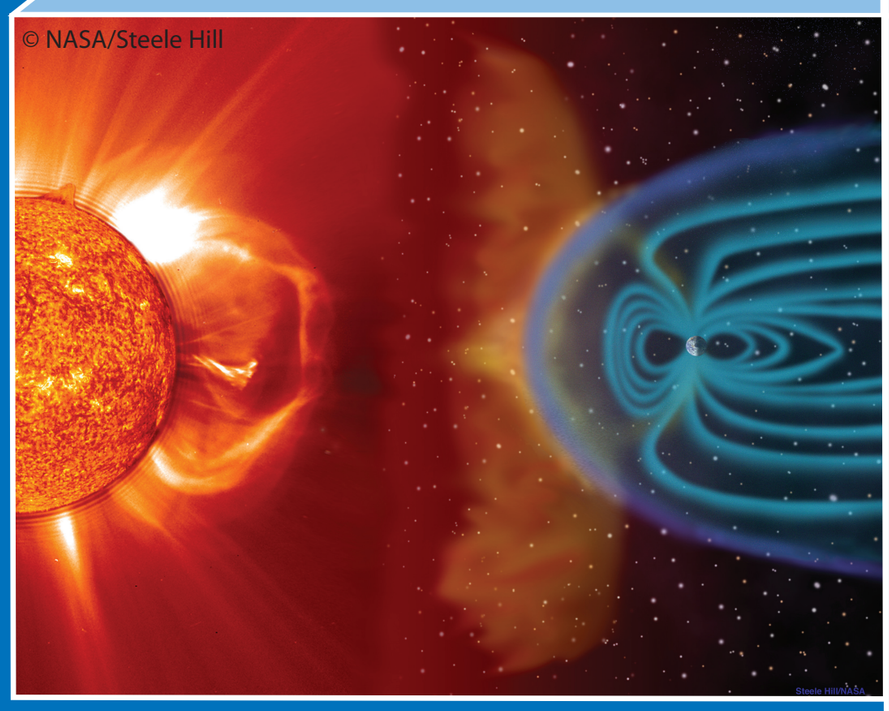
Berlin Mathematical School

BMS Friday Colloquium

Friday 25 April 2014 at 14:15

Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin



Eduard Feireisl (*AS CR*)

Interaction of scales in mathematical fluid dynamics

The interaction of different scales in fluid models gives rise to interesting mathematical problems called singular limits. Besides formal computations, there are well developed mathematical methods and tools to rigorously attack these problems. In the example of the Navier–Stokes system describing the motion of a compressible viscous fluid, Feireisl will show different kinds of singular behavior including asymptotic incompressibility – the fluid can be described by an incompressible model, the high Reynolds or the inviscid limit characteristic for turbulence, and the fast rotation limit typical for certain models in geophysics.

In his talk, Feireisl will discuss these phenomena acting separately as well as in a concerted way. The “path dependence” of such a process plays a crucial role in identifying suitable mathematical models for numerical implementations. Our goal, however, is not only to identify the efficient models, but also to understand the complexity of the phenomena arising in the limit regimes. A typical example is acoustic waves, neglected in certain models, but still present as a part of solutions to the underlying equations.

Eduard Feireisl is a senior researcher at the Academy of Sciences of the Czech Republic (AS CR). His fields of interest include partial differential equations, dynamical systems and mathematical fluid mechanics. He did his doctorate at AS CR in 1988 and habilitation at Charles University, Prague in 2009. He has held visiting positions in Germany, France, USA, China and Japan, and he began his current full professorship in 2011.

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