



Thursday, November 16, 2017

1:00pm-2:00pm (refreshments at 12:45pm)

ECCR 257 (Newton Lab in Classroom Wing of Engineering Center)

University of Colorado, Boulder

Turbulent convection in extended domains: Lagrangian and Eulerian analysis of large-scale patterns

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Turbulent convection flows in nature are often organized in prominent and regular patterns that persist for long times and extend over scales which are much larger than the typical height scale. Examples are cloud streets in the atmosphere or granulation patterns at the solar surface. This large-scale order which is termed turbulent superstructure of convection is observed albeit the flows are highly turbulent with a very large Rayleigh number Ra that characterizes the thermal driving. These flow patterns appear in turbulent convection flows with very different molecular dissipation properties, i.e., for flows at various Prandtl numbers Pr . We report a recent analysis of the typical large-scale pattern scales in the Eulerian and Lagrangian frames of reference. It is based on direct numerical simulations of a flow that is a paradigm for many geo- and astrophysical turbulent flows, large-aspect ratio Rayleigh-Bénard convection.

Biography: Dr. Jörg Schumacher is Professor for Fluid Mechanics at the Technical University of Ilmenau (TU Ilmenau) in Ilmenau, Germany. Prof. Schumacher specializes in numerical simulations of complex fluid flows, with particular emphases on thermal convection, magnetohydrodynamics, Marangoni convection, and turbulence. Prof. Schumacher received his PhD in Theoretical Physics from the Astrophysical Institute in Potsdam, was a Postdoctoral fellow at Philipps University Marburg, a Feodor-Lynen Fellow of the Alexander von Humboldt Foundation at Yale University, and a Research Associate at Philipps University Marburg. In 2005, Prof. Schumacher joined TU Ilmenau as Assistant Professor for Theoretical Fluid Mechanics. In 2008, Prof. Schumacher received the Heisenberg Research Professorship, and he became Professor for Fluid Mechanics at TU Ilmenau in 2013.

