

Lothar-Collatz-Seminar

Wed, 24. April · **11:00** · Geom 241

Dr. Roland Welter (Universität Hamburg)

Rotating Rayleigh Benard convection: Attractors, bifurcations and heat transport via a Galerkin hierarchy

Abstract:

Abstract: Motivated by the need for energetically consistent climate models, the Boussinesq-Coriolis (BC) equations are studied with a focus on the Nusselt number, defined as the averaged vertical heat transport. The Howard-Krishnamurthy-Coriolis (HKC) hierarchy is defined by explicitly computing the Galerkin truncations and selecting the Fourier modes in a particular way, such that this hierarchy can be shown to energy relations consistent with the PDE. Well-posedness and the existence of an attractor are then proven for the BC model, and an explicit upper bound on the attractor dimension is given. By studying the local bifurcations at the origin, a lower bound on the attractor dimension is provided. Finally, a series of numerical studies are performed by implementing the HKC hierarchy in MATLAB, which investigate convergence of the Nusselt number as one ascends HKC hierarchy as well as other issues related to heat transport parameterization.

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www.c3s.uni-hamburg.de/news-events/seminar-c3s.html

