Karlsruher PDE-Seminar

Isometric embeddings and turbulent energy cascades

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One of the cornerstones of the theory of 3-dimensional turbulence is the energy cascade: in a turbulent fluid the energy is transferred successively to smaller and smaller scales by some non-linear mechanism until at the smallest scale it is transferred to heat by viscous dissipation. A consequence is the so-called dissipation anomaly. Although as a heuristic explanation the energy cascade is widely accepted by the community, few rigorous results are known. This is also closely related to a famous conjecture of Onsager from 1949 and to Kolmogorov's theory of turbulence. In joint work with Camillo De Lellis we interpret this cascade using an old idea of Nash and obtain a method of construction, which can be seen as a "hard" PDE version of Gromov's convex integration. In the talk I will recall the basic scheme of Nash, explain the similarities and differences with our scheme and report on current progress regarding Onsager's conjecture.

Termin: Donnerstag, 7. März 2013, 17:30 Uhr
Ort: 1C-03, Allianz-Gebäude 05.20
Gastgeber: Die Dozenten des Schwerpunkts Partielle Differentialgleichungen