



Institut für
Angewandte Mathematik



Leibniz
Universität
Hannover

Institut für Angewandte Mathematik
10.06.2013

Oberseminar Analysis und Theoretische Physik

**Prof. Dr. Werner Varnhorn
Universität Kassel**

“On optimal initial value conditions for strong solutions of the Navier-Stokes equations”

Abstract:

Let $[0, T)$ with $0 < T \leq \infty$ be a time interval and $\Omega \subseteq \mathbb{R}^3$ a smoothly bounded domain.

Consider in $[0, T) \times \Omega$ the non-stationary nonlinear Navier-Stokes equations with prescribed initial value $u_0 \in L^2_\sigma(\Omega)$ and external force $F = \operatorname{div} F$ with

$F \in L^2(0, T; L^2(\Omega))$. It is well-known that there exists at least one weak solution of the Navier-Stokes system in $[0, T) \times \Omega$ in the sense of Leray-Hopf. Since we do not know if these solutions are unique it is an important problem to investigate conditions on the data u_0 and f - as weak as possible - to guarantee the existence of a unique strong solution $u \in L^s(0, T; L^q(\Omega))$ satisfying Serrin's condition $\frac{2}{s} + \frac{3}{q} = 1$ with $2 < s < \infty, 3 < q < \infty$ at least

for $T > 0$ sufficiently small. During the last years several sufficient conditions have been given, yielding step by step a larger class of corresponding local strong solutions. These conditions, however, need not to be necessary, in contrast to our result which is optimal in a certain sense and yields the largest possible class of such local strong solutions.

**Dienstag, 18.06.2013, 15:00 Uhr, Raum g005
Hauptgebäude der Universität**

Über Ihren Besuch würden sich freuen:

**Prof. Dr. Joachim Escher
Prof. Dr. Olaf Lechtenfeld
Prof. Dr. Elmar Schrohe
Prof. Dr. Christoph Walker**