L^p-Theory of the Navier-Stokes Flow in the Exterior of a Moving or Rotating Obstacle

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In this talk we consider the equations of Navier-Stokes in the exterior of a rotating domain. It is shown that, after rewriting the problem on a fixed domain Ω, the solution of the corresponding Stokes equation is governed by a C_0-semigroup on $L^p_\sigma(\Omega)$, $1 < p < \infty$, with generator

$$Au = P(\Delta u + Mx \cdot \nabla u - Mu).$$

Here P denotes the Helmholtz projection. Moreover, for $p \geq n$ and initial data $u_0 \in L^p_\sigma(\Omega)$, we prove the existence of a unique local mild solution to the Navier-Stokes problem. This is joint work with M. Geissert and H. Heck.