OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

WORKGROUP FOR MULTIPHAS FLOWS

Aquaplaning

Grant number

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Project leader

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Realized by

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Keywords

Aquaplaning, multiphase flows, entrainment of air, rotational flow

Short description of the project

Aquaplaning is a major source of traffic accidents on wet roads and under rainy conditions. This project aims at developing predictive models for aquaplaning in realistic conditions, taking into account the tire structure, its large deformability and road interaction, the fluid properties, such as free surfaces, spray formation and air entrainment, including turbulence effects. The resulting structure coupled models will be implemented in a user-friendly software environment and validated by a series of dedicated experiments.

The final goal of the project is not only the improvement of the knowledge on the aquaplaning phenomenon, but also the development of an effective simulation tool to enable the manufacturers to optimise and validate new tire designs and safety unc wet conditions. An additional objective is the dissemination of the results to the public and to the safety and transport agencies. The main content of the work will be the experimental investigation of aquaplaning. Especially, the entrainment of air into the bo wave in front of the tire will be analyzed. Significant values like concentration, velocity and dimension of the bubbles in the bow wave will be measured by PIV (Particle Image Velocimetry) and PDA (Phase-Doppler anemometry). With these results it is possible to develop models for description of the two-phase flow. The partners of the project will implement this models into thei software for flow-calculation.