Bachelor Thesis

(Bakkalaureatsarbeit)

on the topic

"Magneto-Hydro-Dynamics"

- **Title:** Magneto-Hydro-Dynamic Equations
- **Supervisor:** DI Peter Gangl
- **Student:** Andreas Schafelner
- **Abstract:** Magneto-Hydro-Dynamics (MHD) denotes the study of the dynamics of electrically conducting fluids and is a coupling of the Navier-Stokes equations for fluid dynamics and Maxwell's equations of electromagnetism. The concept behind MHD is that magnetic fields can induce currents in a moving conductive fluid, which in turn create forces on the fluid and change the magnetic field itself. The goal of this Bachelor thesis is to, after introducing the Navier-Stokes and Maxwell equations, describe their coupling and some special applications (e.g. geophysics, astrophysics etc.).
- **Road Map for the Bachelor Thesis:**
  1. Introduction
  2. Navier-Stokes Equations
  3. Maxwell's equations
  4. Magneto-Hydro-Dynamics
  5. Special Applications
  6. Conclusions
  7. References
- **Literature:** Lectures and Seminars (Proseminar) on Mathematical Models in Engineering
- **Additional Literature:** [1]

References

[1] P. A. Davidson. *An introduction to Magnetohydrodynamics*. Cambridge University Press, 2001.