

Master Thesis / Project

„Scientific Visualization and Visual Analytics of Planetary and Stellar Magnetic Fields”

Start: 01.06.2016

Contact: M.Sc. Patrick Rüdiger, ruediger@rhrk.uni-kl.de, 36- 415

Numerical simulation of the magnetic field generation of the Earth (the geodynamo), other planets, and the sun, presents an enormous computational and visualization challenges. Simulations of the physical system that generates the magnetic field, the geodynamo, is being developed and carried out on some of the world’s fastest computers, requiring massively parallel computing to carry out long-duration simulations at sufficiently high resolution. Effective and specialized analysis and visualization systems capable of allowing a geophysicist to truly comprehend a simulated data set in its entirety and derive the relevant, hidden scientific insight are still missing. Our research effort is motivated by this fact, and the members of interdisciplinary constituting this effort jointly specified the design objectives of the magnetic field.

Challenges:

- Large time varying multi- field data
- Unique features of Magnetic Fields
- Visual Perception & Knowledge gain
- In- Situ Analysis and Visualization

Requirements:

- Advanced studies in Computer Science, Applied Computer Science, Mathematics, Physics
- Advanced Knowledge in Computer Graphics and Scientific Visualization
- Experience in one major programming/ scripting language (e.g. C++, Python, Matlab)

Students with own ideas and concepts, even not in the full scope of this topic are highly encouraged to apply.