

Public Outreach - Didactics – Science in the context of **Cosmic Magnetic Fields**

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„The larger our ignorance, the stronger the magnetic field” was a statement of the astrophysicist Lodewijk Woltjer already made in 1965. But at that time not many scientists really believed in a sizable importance of magnetic fields for explaining astrophysical phenomena and evolutions in the distant Universe. This special issue was more or less restricted for applications concerning the Sun or the magnetosphere of the Earth. Beyond that powerful magnetic codes had not been developed, the computer power was still insufficient. If at all, magnetic astrophysical problems were studied mainly analytically. Particularly in the last ten years the situation has changed dramatically. Astrophysicists are today examining and estimating the influence of cosmic magnetism in nearly every field of interest. Huge telescopes working in different wavelengths now deliver much better specifications about the analyzed field structures, the capability of the computer facilities and the used codes are now much more highly evolved. Especially how **Cosmic Magnetic Fields** are generated nearly everywhere in the Cosmos, how they support or influence the formation of and the release of explosive processes in astronomical objects like galaxies, stars or planets and possibly even how they mediate the evolution and protection of life in the Universe ... these are really interesting questions for so many “people on the street”.

In a time of fast developing modern media **Popular Science** is today well accepted in the public audience, contrary to the actually though still decreasing interest of kids in the school for subjects like physics. In this connection it is surely one of the duties of scientist, a debt to the society who invests money and notice to their work, to motivate young scholars, for sure as well their students by carrying out attractive **Public Outreach** projects respectively by regarding **Didactical Aspects** in their educational work. Furthermore this could be personally fundamental for a satisfying scientific work not to stay in a kind of ivory tower without any contact to the public, or as well to scientist working in other fields. For the department as a whole such efforts are for sure as well

important as an effective instrumentation for propaganda, to convince politicians, who want to support and encourage their work not only financially in a sustainable way. The examination with the physics of cosmic magnetic fields is a very fascinating and motivating business. The **Theories** are developed deeply, accepted **Models** can be tested analytically or with numerical simulations and real experiments are carried out. Like in school lessons, “life experiments in space” made with telescopes and detectors produce a lot of **Observational Data** which can be compared with the results one can get by **Numerical** or real **Laboratory Experiments** to improve the understanding of the different **Astronomical Phenomenons**.

Emphasizing the typical characteristics of a popular science orientated approach, the talk starts with some beautiful pictures and video sequences convincing everyone, that cosmic magnetic fields really play central roles for example in the ionosphere of the Earth, in the solar atmosphere or in disk-jet-structures. The second part imparts some impressions from the so called Rädlerfest, arranged by NORDITA in Stockholm, where scientists from all over the world came together in February 2011 to appreciate the work of Karl-Heinz-Rädler about the alpha-effect, turbulent and mean field dynamo theory. Onto future orientated discussions during this meeting struck among others as well the role of dynamo experiments, didactical and public outreach aspects. For this reason potential benefits of a highlighted didactically orientated view of scientific efforts will be summarized in the following part of the talk. After that the special role of cosmic magnetic fields in the modern astrophysical research concerning observational facts, theories, models, simulations and experiments will be pointed out exemplarily under the striking motto “To **B** or not to **B**” (The letter **B** stands for the magnetic flux density). The talk ends with suggestions and a required discussion about the possible importance of public outreach for different subjects in the field of cosmic magnetic fields.

Summery of the talk

1. **Popular Sciences and Cosmic Magnetic Fields**
2. **Turbulence, Dynamo Theory and more – Impressions from the RädlerFest 2011**
3. About the benefits of a **Didactically Orientated View** onto Scientific Affairs
4. Impact of **Cosmic Magnetic Fields** in the modern **Astrophysical Research**
5. About the importance of **Public Outreach** for the Society

Further Informations about the talk you can get from

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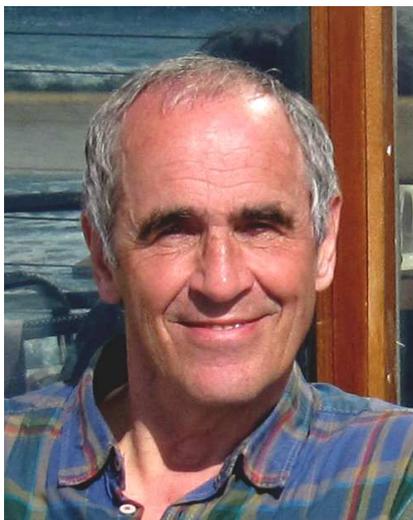
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After his academic studies of astrophysics (diploma thesis with the title “Stationary Spherical $\alpha\omega$ -Dynamos and the Earth Magnetic Field”) Ulrich v. Kusserow taught as a teacher in grammar schools. For many years he was the chairman of the Olbers Society in Bremen. He is a member of the Astronomische Gesellschaft (AG) and the German Physical Society (DPG). For several years he took part in the Institute for Didactics of Physics at the University of Potsdam working about the subject “Learning about Cosmic Magnetic Fields”. Since many years he is guiding a working group about solar physics in the Olbers Society, where he is as well in charge of a laboratory experiment on solar physics for advanced students of the University Bremen. He writes articles and gives talks primarily on didactical aspects of modern astrophysics in subject areas like solar and cosmic magnetic fields, space physics, formation of planets, stars and galaxies as well as environmental and climate problems. He works as well in the framework for the skill enhancement of teachers. As a regular guest he today collaborates in the “Astroparticle Seminar” at the Jacobs University in Bremen. He is advertising and supporting the Bremen PALAZZI publishing company in

producing their annual “Star Time” calendar, the German Aerospace Center (DLR) in Bremen in arranging their “Observing the Sun” school lab experiment.